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FIG.1A

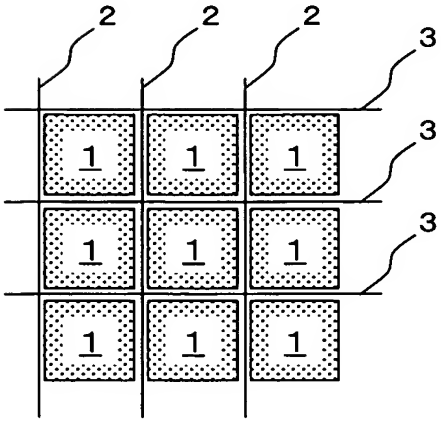

FIG.1B

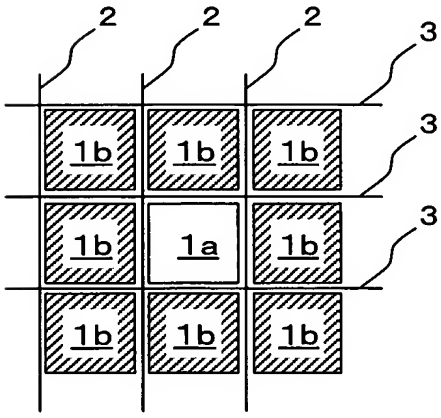

FIG.2A

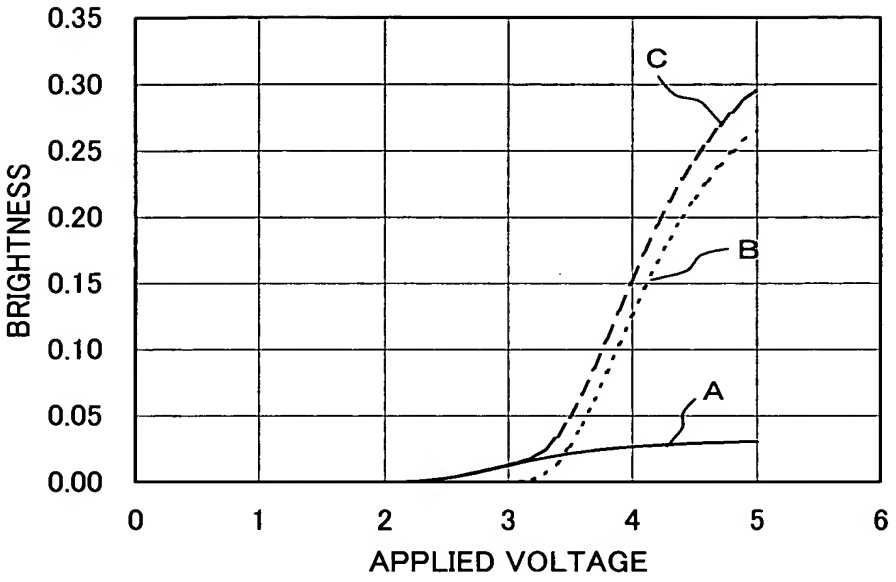
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
BRIGHTNESS
C
B
A
0
1
2
3
4
5
6
APPLIED VOLTAGE

FIG.2B

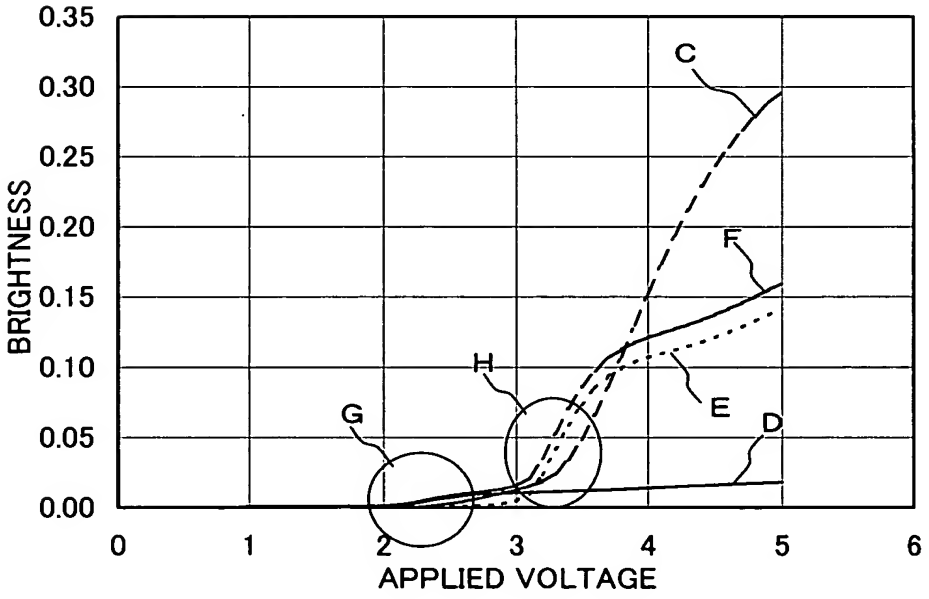
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
BRIGHTNESS
C
F
H
G
E
D
0
1
2
3
4
5
6
APPLIED VOLTAGE

FIG.3A

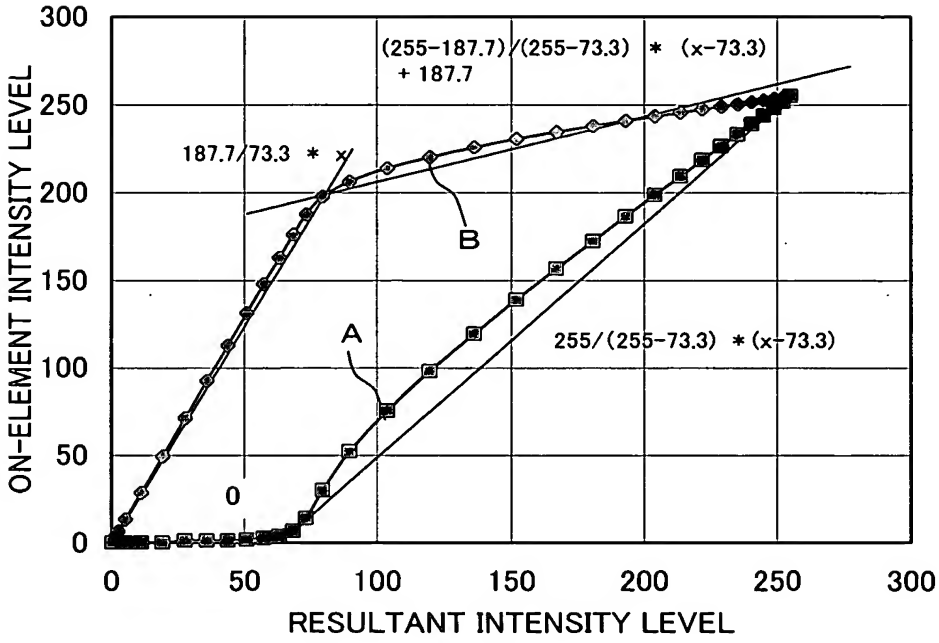
300
250
200
150
100
50
0
ON-ELEMENT INTENSITY LEVEL
0
50
100
150
200
250
300
RESULTANT INTENSITY LEVEL
(255-187.7)/(255-73.3) * (x-73.3)
+ 187.7
187.7/73.3 * x
B
A
255/(255-73.3) * (x-73.3)
0

FIG.3B

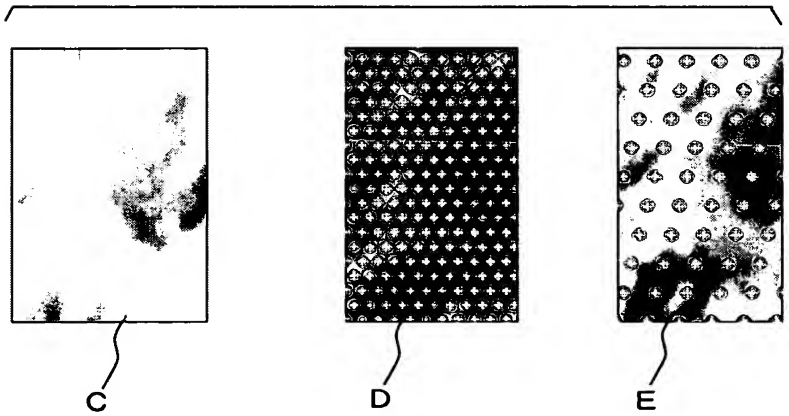
C
D
E

FIG.4A

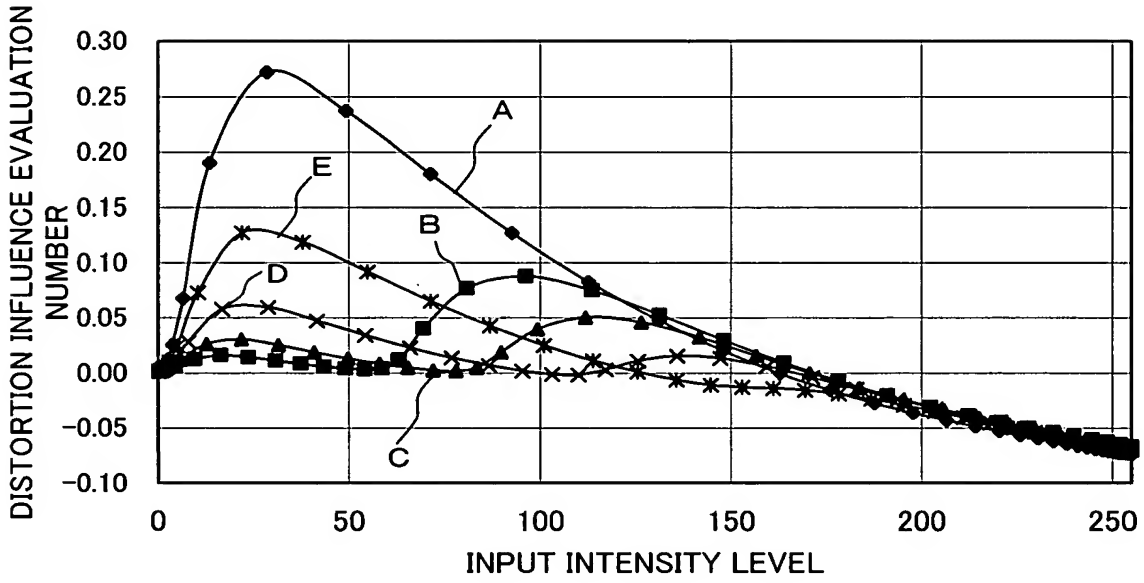

FIG.4B

	HT PARTITION AREA RATIO				
	UNPROCESSED	8:8	4:12	2:14	1:15
IMAGE F	×	×	○	◎	○
IMAGE G	×	○	◎	○	×

FIG.5

DISTANCE FROM SCREEN (cm)	HT PARTITION AREA RATIO				
	UNPROCESSED	8:8	4:12	2:14	1:15
10	◎	×	×	×	×
20	◎	×	×	×	×
30	◎	×	×	×	×
40	◎	○	×	×	×
50	◎	○	×	×	×
60	◎	◎	○	×	×
70	◎	◎	○	×	×
80	◎	◎	○	○	×
90	◎	◎	◎	○	×
100	◎	◎	◎	○	×
110	◎	◎	◎	◎	○
120	◎	◎	◎	◎	○
130	◎	◎	◎	◎	○
140	◎	◎	◎	◎	○
150	◎	◎	◎	◎	◎
160	◎	◎	◎	◎	◎

FIG.6

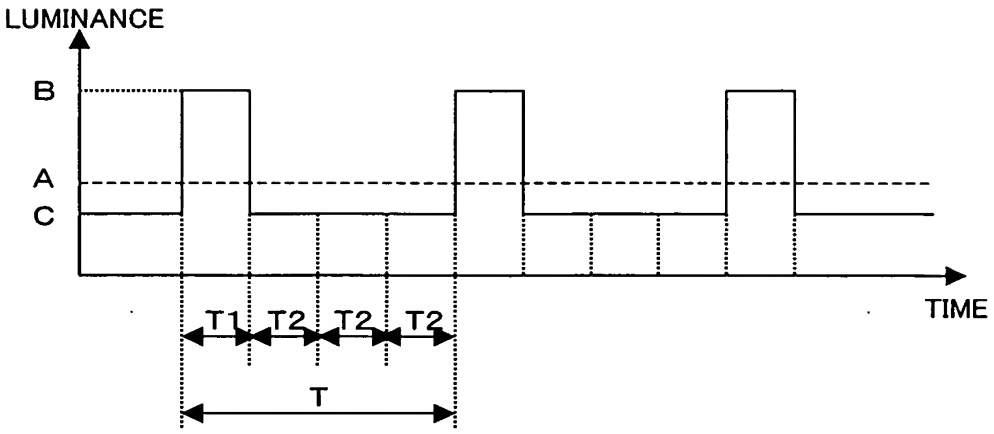

FIG.7A

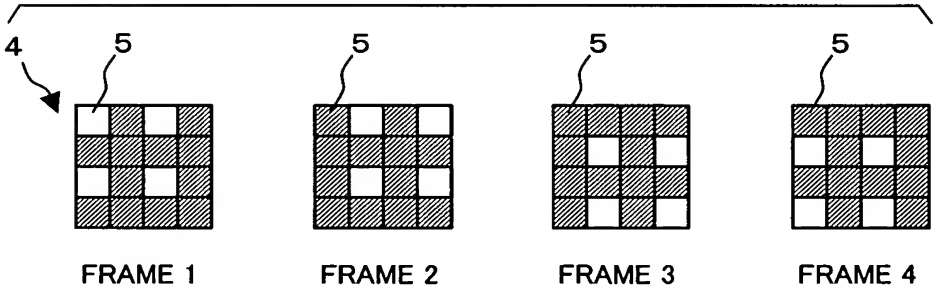

FIG.7B

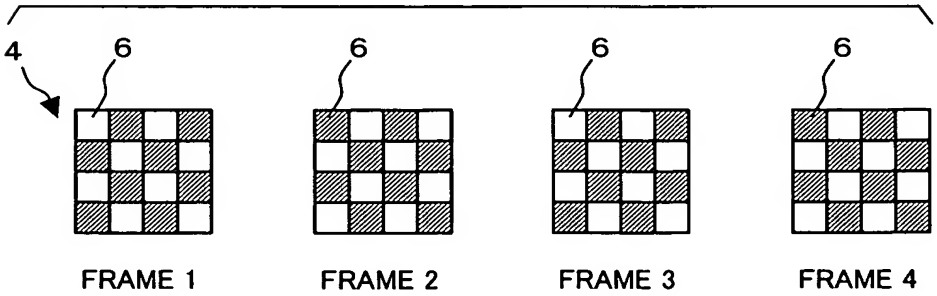

FIG.8

DISTANCE FROM SCREEN (cm)	HT PARTITION AREA RATIO				
	UNPROCESSED	8:8	4:12	2:14	1:15
10	◎	○	×	×	×
20	◎	○	○	×	×
30	◎	◎	○	○	×
40	◎	◎	◎	○	×
50	◎	◎	◎	○	○
60	◎	◎	◎	◎	○
70	◎	◎	◎	◎	○
80	◎	◎	◎	◎	○
90	◎	◎	◎	◎	◎
100	◎	◎	◎	◎	◎
110	◎	◎	◎	◎	◎

FIG.9

DISTANCE FROM SCREEN (cm)	HT PARTITION AREA RATIO				
	UNPROCESSED	8:8	4:12	2:14	1:15
10	◎	◎	○	×	×
20	◎	◎	◎	○	○
30	◎	◎	◎	○	○
40	◎	◎	◎	◎	○
50	◎	◎	◎	◎	◎
60	◎	◎	◎	◎	◎
70	◎	◎	◎	◎	◎

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FIG.10

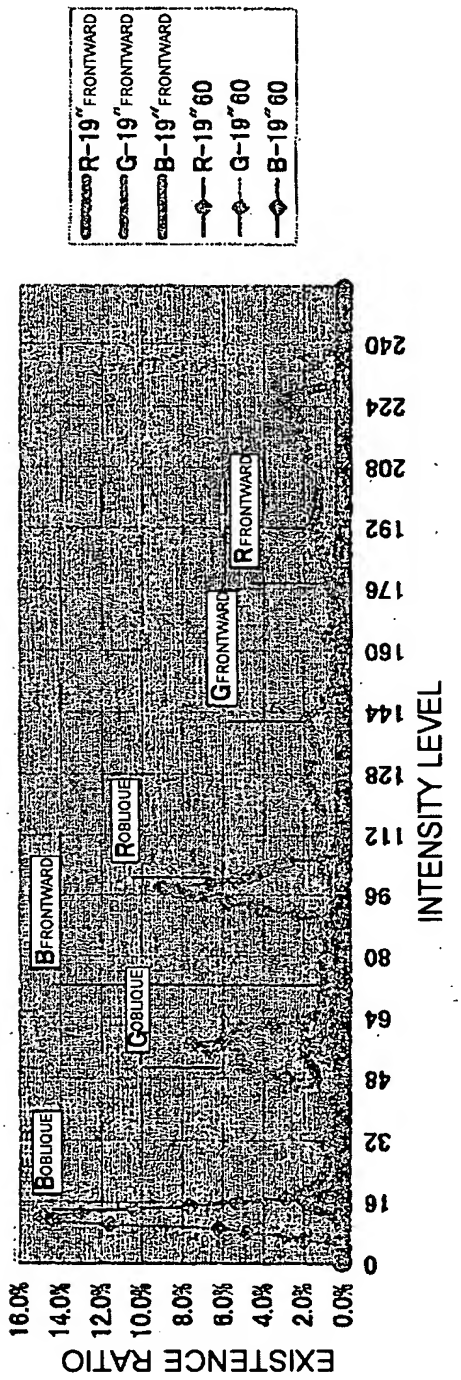
R-19" FRONTWARD
G-19" FRONTWARD
B-19" FRONTWARD
R-19"60
G-19"60
B-19"60
BOBLIQUE
BFRONTWARD
ROBLIQUE
GOBLIQUE
GFRONTWARD
RFRONTWARD
0
16
32
48
64
80
96
112
128
144
160
176
192
208
224
240
INTENSITY LEVEL
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
EXISTENCE RATIO

FIG.11

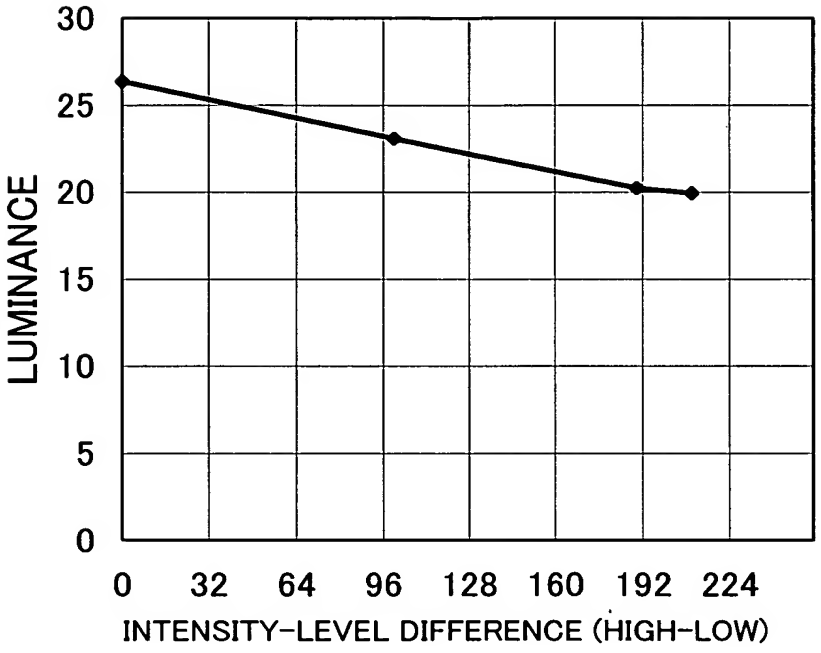
30
25
20
15
10
5
0
LUMINANCE
0
32
64
96
128
160
192
224
INTENSITY-LEVEL DIFFERENCE (HIGH-LOW)

FIG.12A

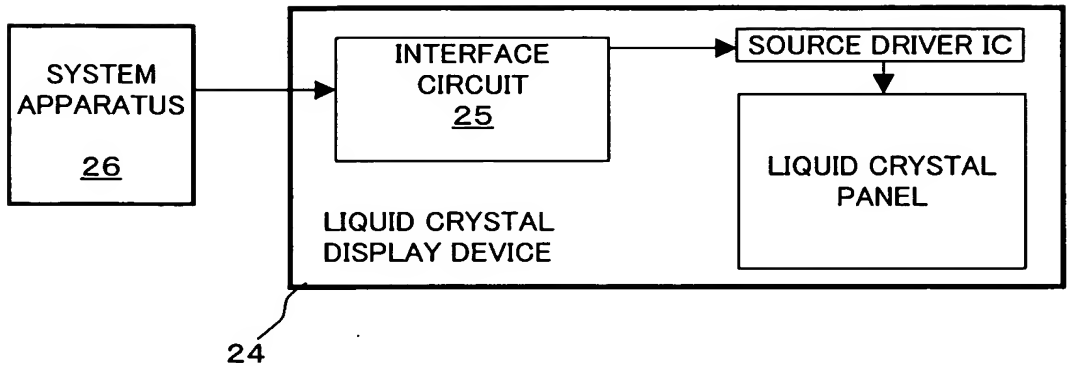

FIG.12B

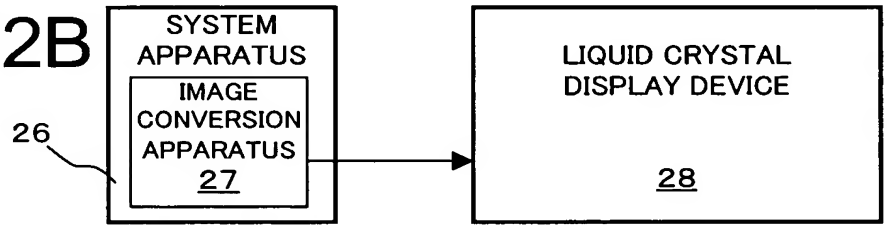

FIG.12C

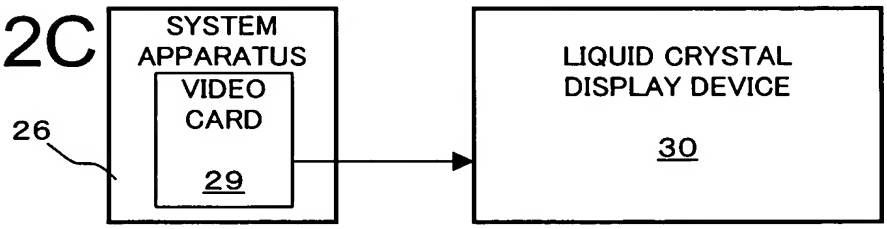

FIG.12D

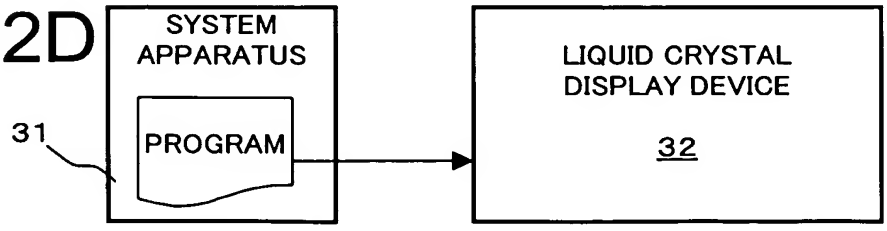

FIG.13

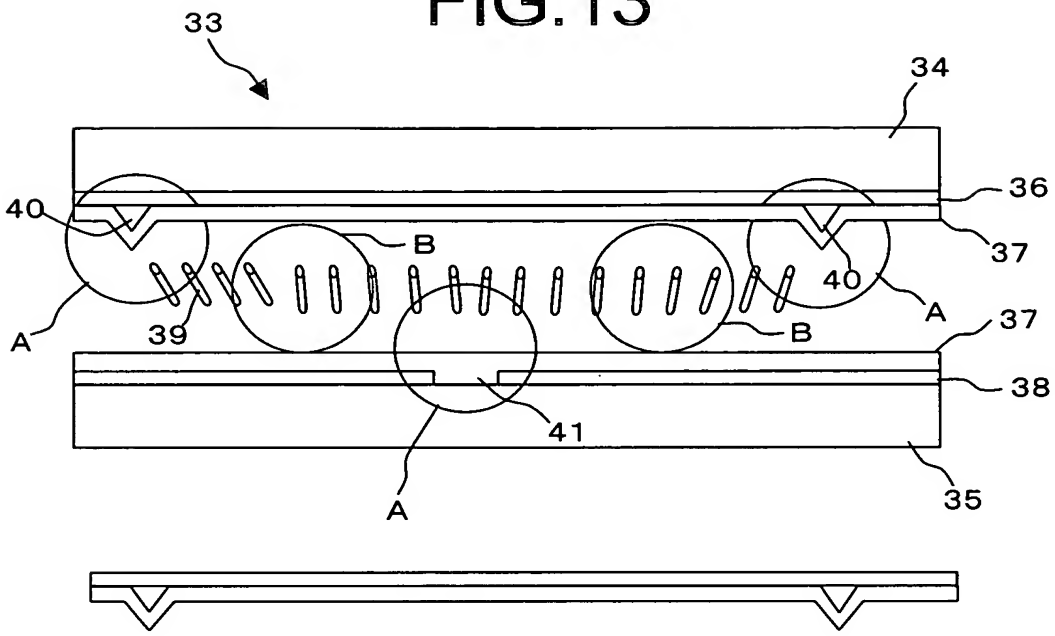
33
34
36
40
B
37
40
A
39
B
37
A
38
41
A
35

FIG.14

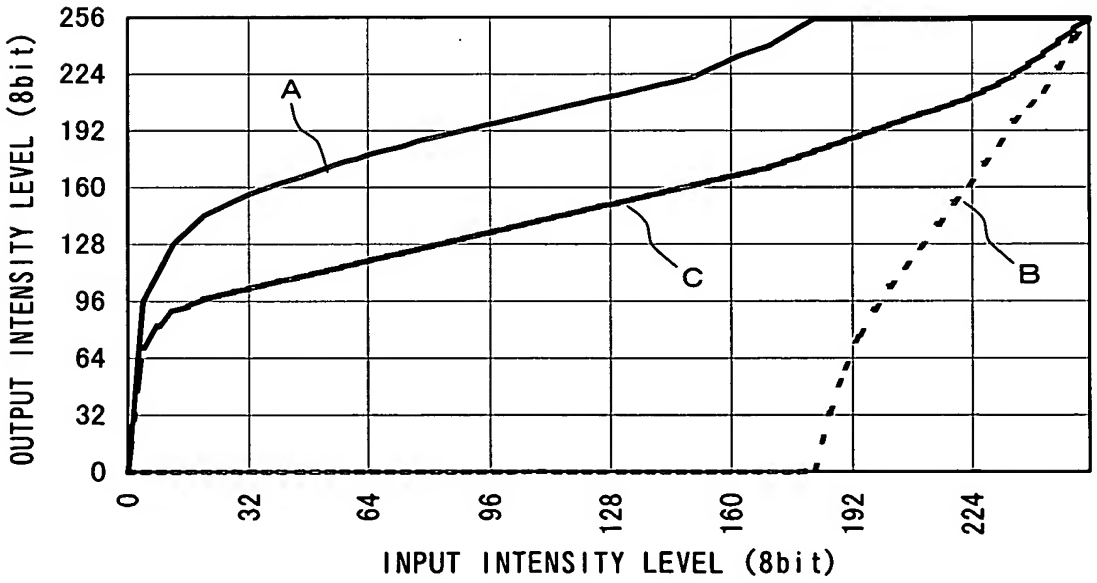
256
224
192
160
128
96
64
32
0
OUTPUT INTENSITY LEVEL (8bit)
A
C
B
0
32
64
96
128
160
192
224
INPUT INTENSITY LEVEL (8bit)

FIG.15

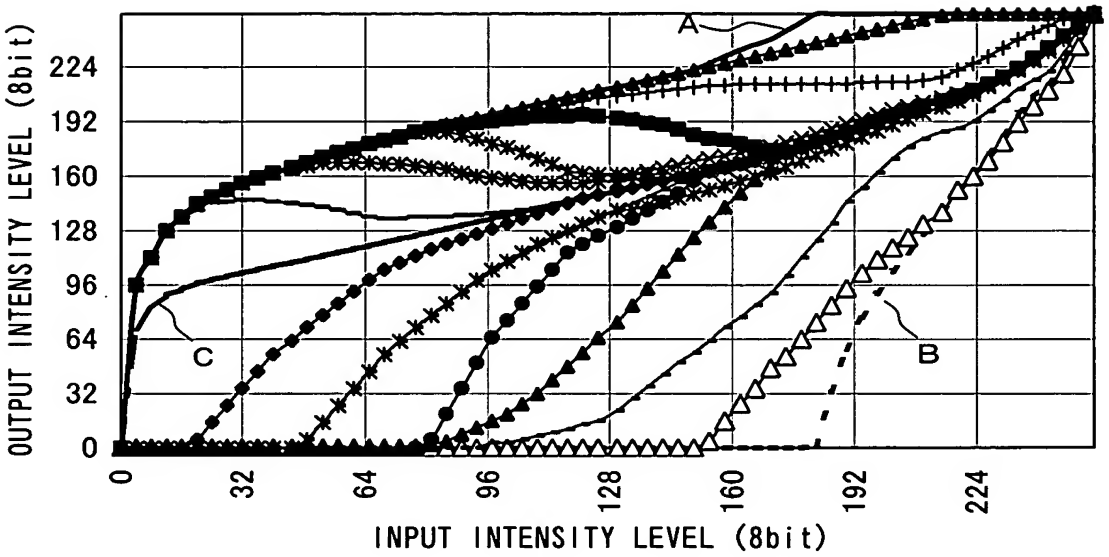
OUTPUT INTENSITY LEVEL (8bit)
0
32
64
96
128
160
192
224
INPUT INTENSITY LEVEL (8bit)
A
B
C

FIG.16

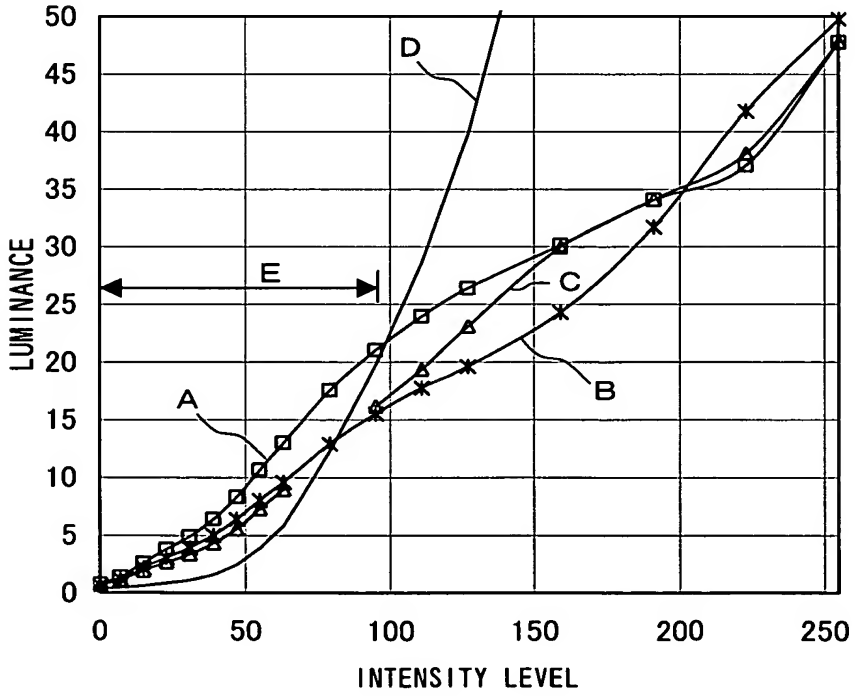
LUMINANCE
0
5
10
15
20
25
30
35
40
45
50
0
50
100
150
200
250
INTENSITY LEVEL
A
B
C
D
E

FIG.17A

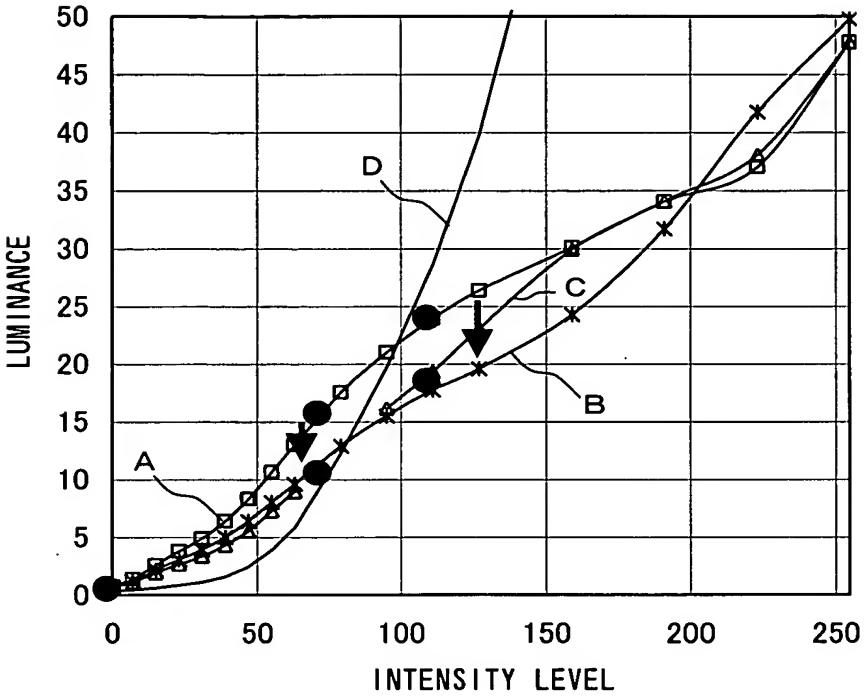

FIG.17B

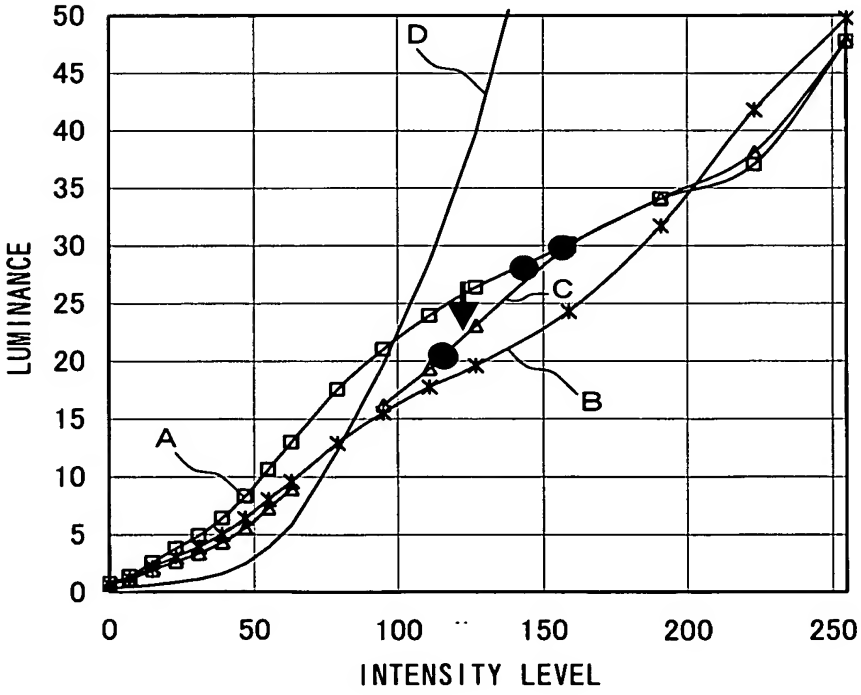

FIG.18A

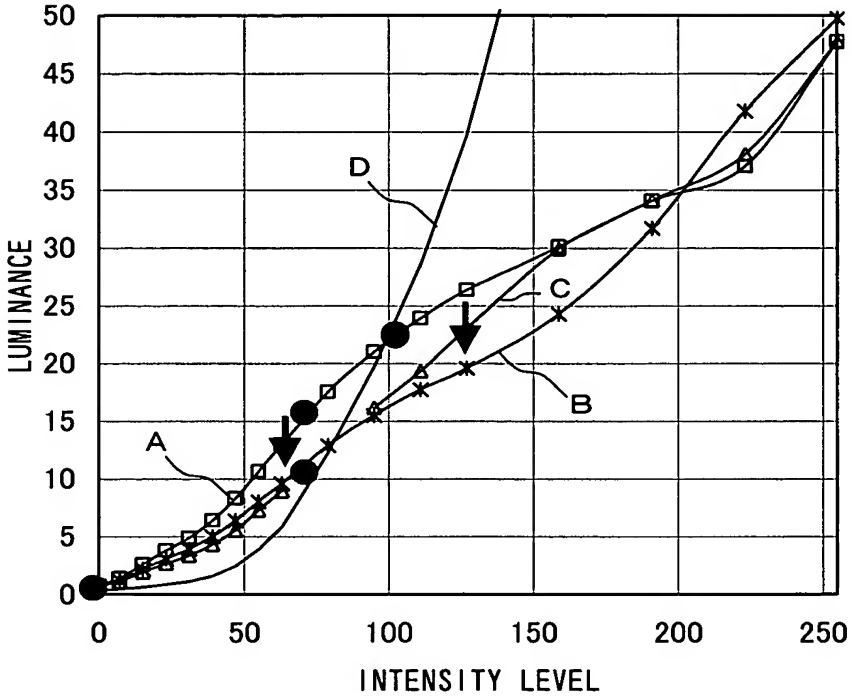

FIG.18B

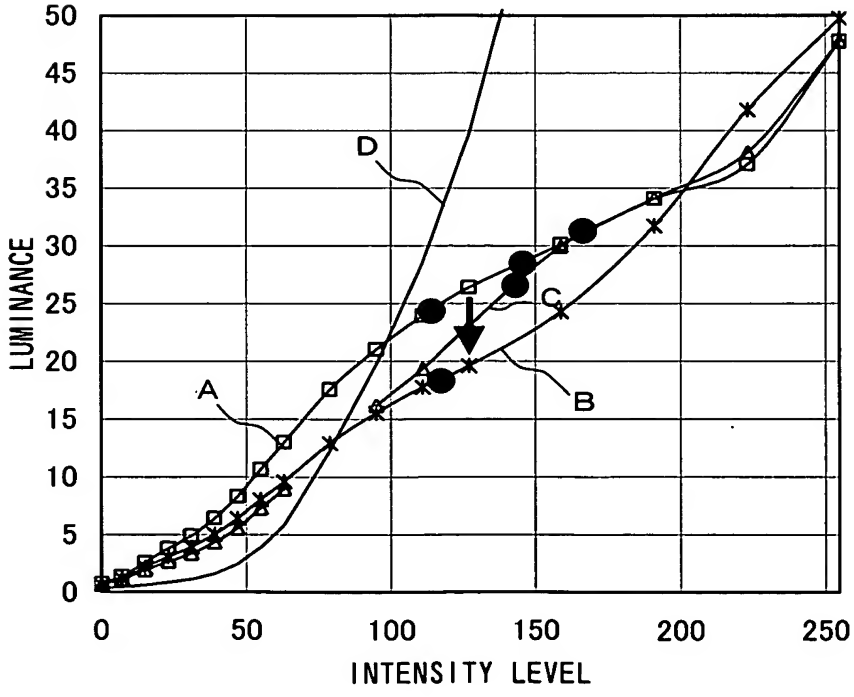

FIG.19

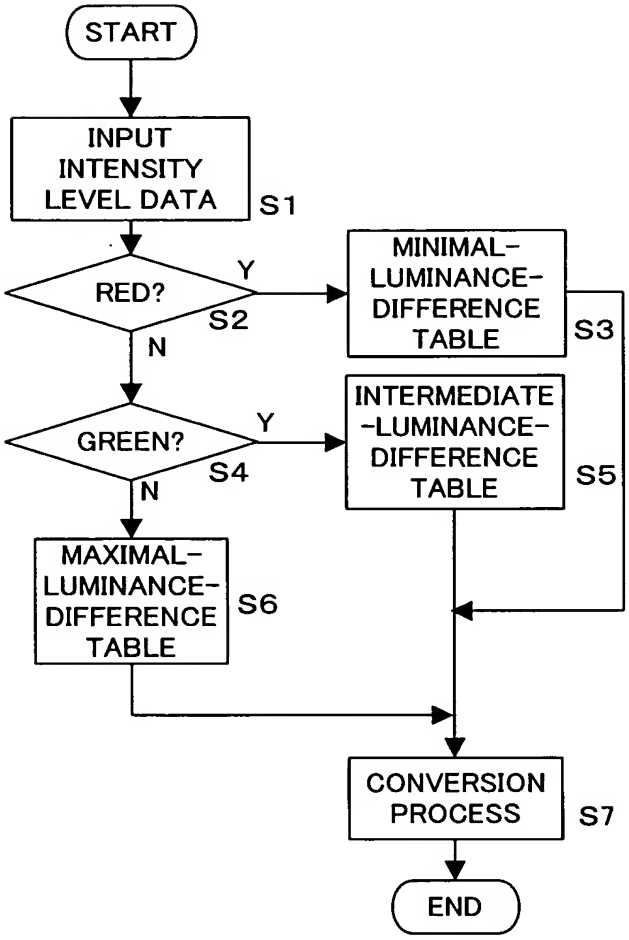
START
INPUT INTENSITY LEVEL DATA
S1
RED?
Y
S2
N
MINIMAL-LUMINANCE-DIFFERENCE TABLE
S3
GREEN?
Y
S4
N
INTERMEDIATE-LUMINANCE-DIFFERENCE TABLE
S5
MAXIMAL-LUMINANCE-DIFFERENCE TABLE
S6
CONVERSION PROCESS
S7
END

FIG.20

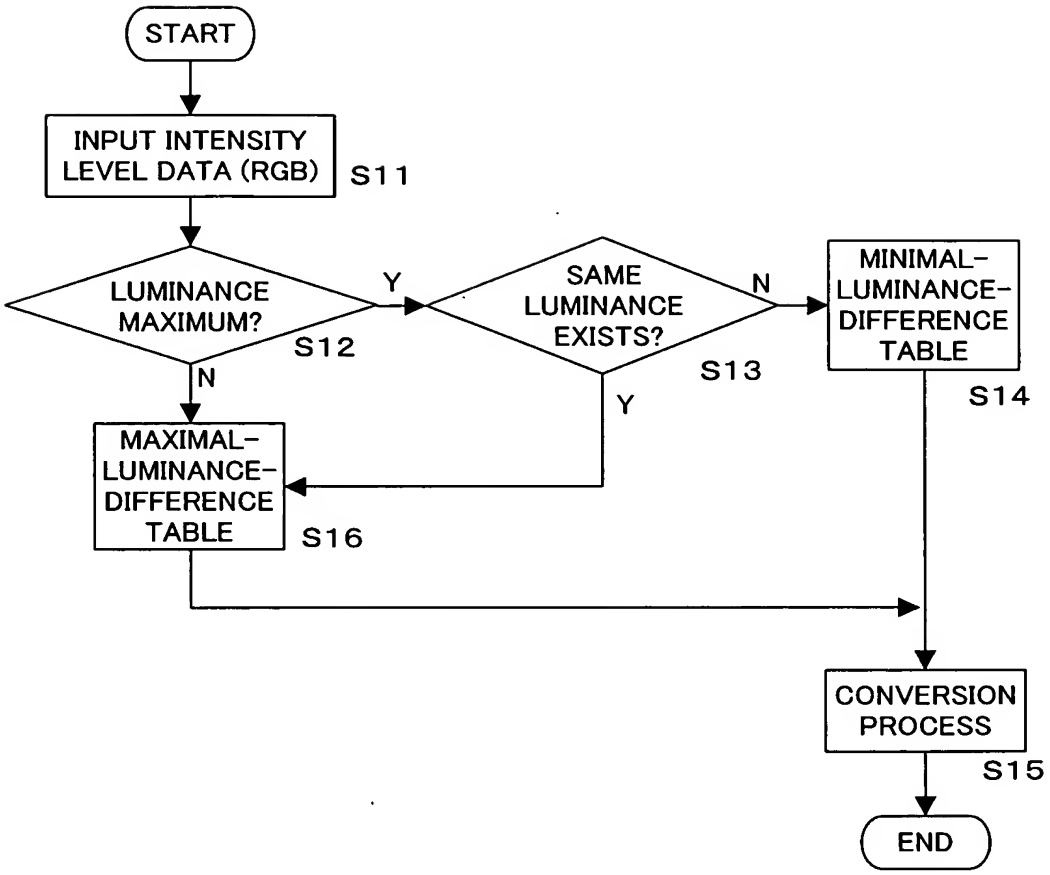
START
INPUT INTENSITY LEVEL DATA (RGB)
S11
LUMINANCE MAXIMUM?
S12
Y
N
SAME LUMINANCE EXISTS?
S13
N
Y
MINIMAL-LUMINANCE-DIFFERENCE TABLE
S14
MAXIMAL-LUMINANCE-DIFFERENCE TABLE
S16
CONVERSION PROCESS
S15
END

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FIG.21A

POINT WITHIN DISPLAY REGION	(1)	(2)	(3)	(4)	(5)	(6)	(7)
INTENSITY LEVEL ON R PIXEL	120	120	120	120	120	120	120
INTENSITY LEVEL ON G PIXEL	117	118	119	120	121	122	123
INTENSITY LEVEL ON B PIXEL	0	0	0	0	0	0	0

R-TABLE	GREAT	GREAT	GREAT	MIDDLE	MIDDLE	MIDDLE	MIDDLE
G-TABLE	MIDDLE	MIDDLE	MIDDLE	MIDDLE	GREAT	GREAT	GREAT

FIG.21B

POINT WITHIN DISPLAY REGION	(1)	(2)	(3)	(4)	(5)	(6)	(7)
INTENSITY LEVEL ON R PIXEL	120	120	120	120	120	120	120
INTENSITY LEVEL ON G PIXEL	117	118	119	120	121	122	123
INTENSITY LEVEL ON B PIXEL	0	0	0	0	0	0	0

R-TABLE	GREAT	GREAT	GREAT-GREAT-MIDDLE	MIDDLE-GREAT	MIDDLE-MIDDLE-GREAT	MIDDLE	MIDDLE
G-TABLE	MIDDLE	MIDDLE	MIDDLE-MIDDLE-GREAT	MIDDLE-GREAT	GREAT-GREAT-MIDDLE	GREAT	GREAT

FIG.22

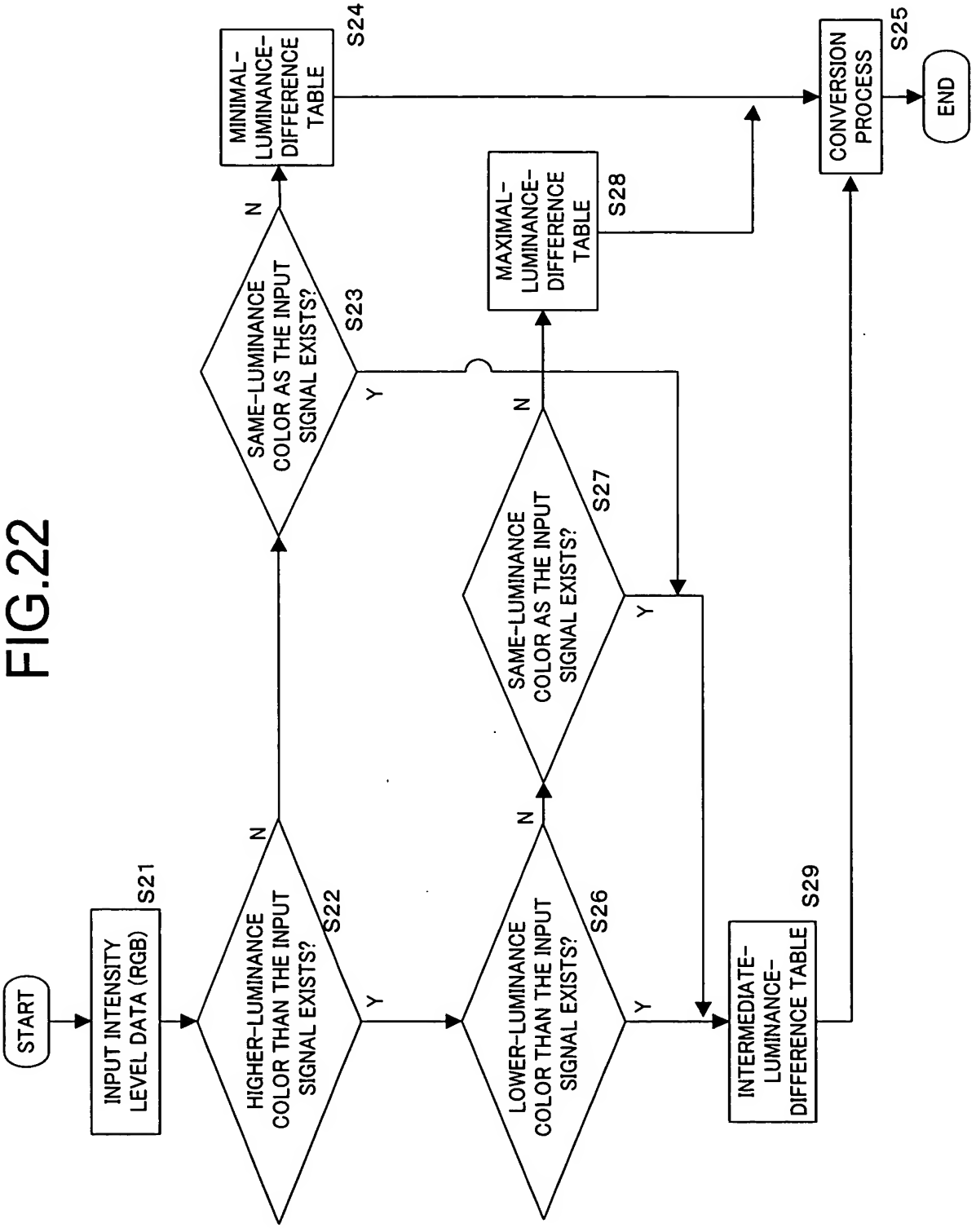

START
INPUT INTENSITY LEVEL DATA (RGB)
S21
HIGHER-LUMINANCE COLOR THAN THE INPUT SIGNAL EXISTS?
S22
N
Y
LOWER-LUMINANCE COLOR THAN THE INPUT SIGNAL EXISTS?
S26
N
Y
SAME-LUMINANCE COLOR AS THE INPUT SIGNAL EXISTS?
S27
N
Y
SAME-LUMINANCE COLOR AS THE INPUT SIGNAL EXISTS?
S23
N
Y
MINIMAL-LUMINANCE-DIFFERENCE TABLE
S24
MAXIMAL-LUMINANCE-DIFFERENCE TABLE
S28
INTERMEDIATE-LUMINANCE-DIFFERENCE TABLE
S29
CONVERSION PROCESS
S25
END

FIG.23A

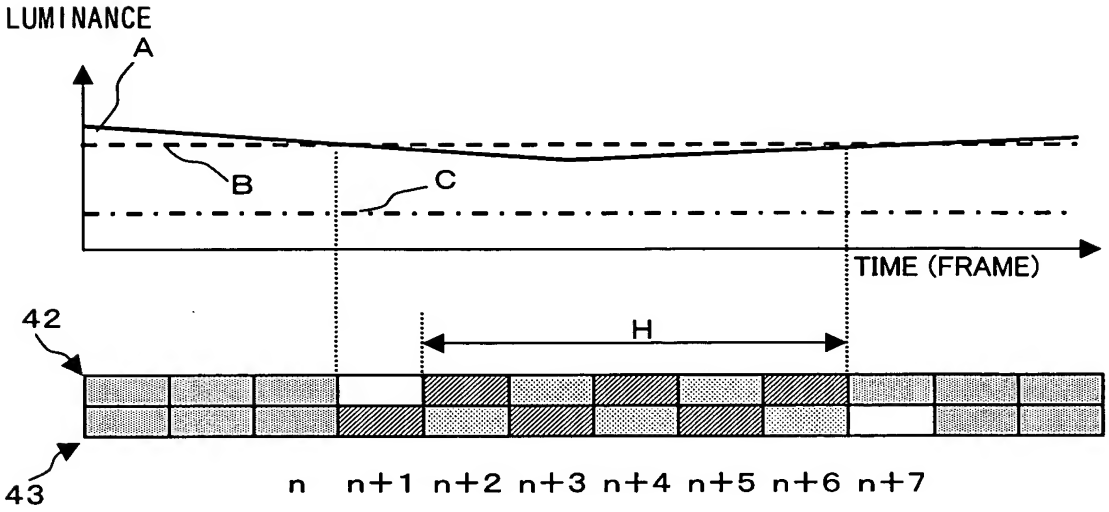


FIG.23B

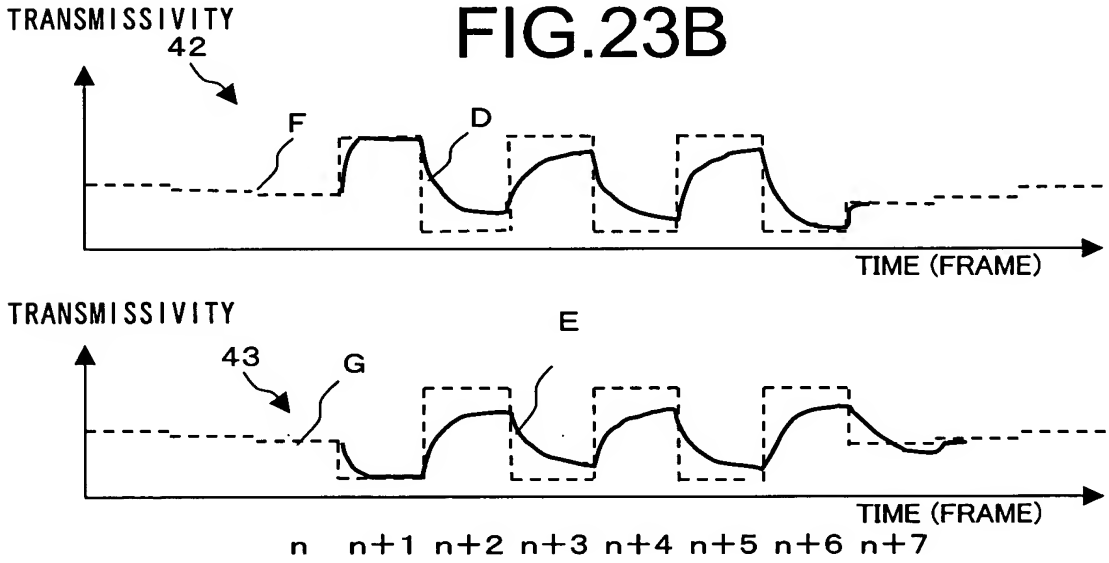


FIG.24

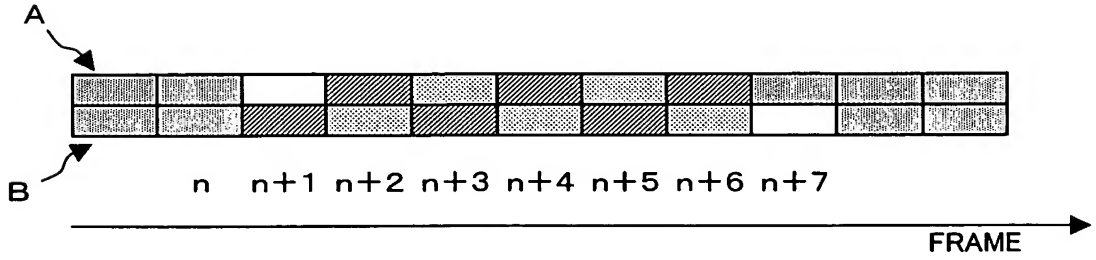


FIG.25A

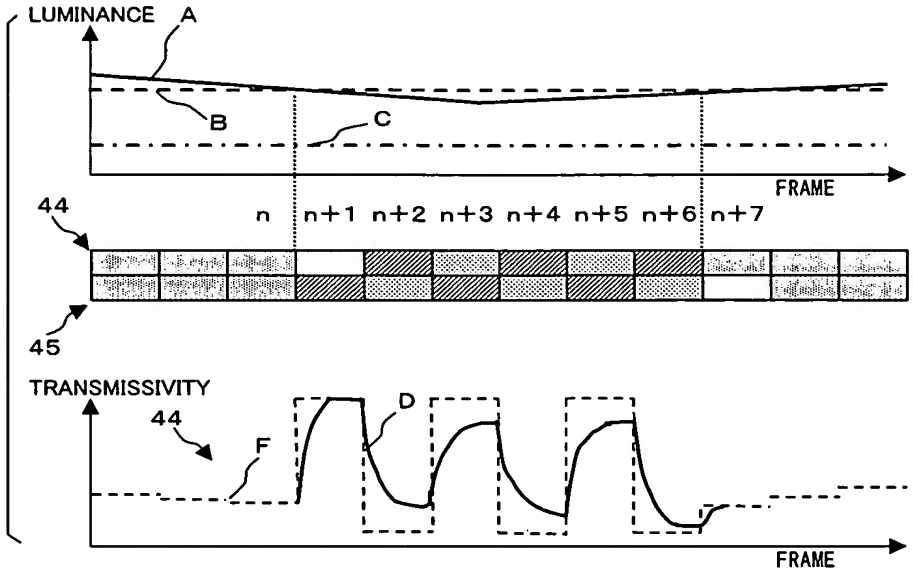


FIG.25B

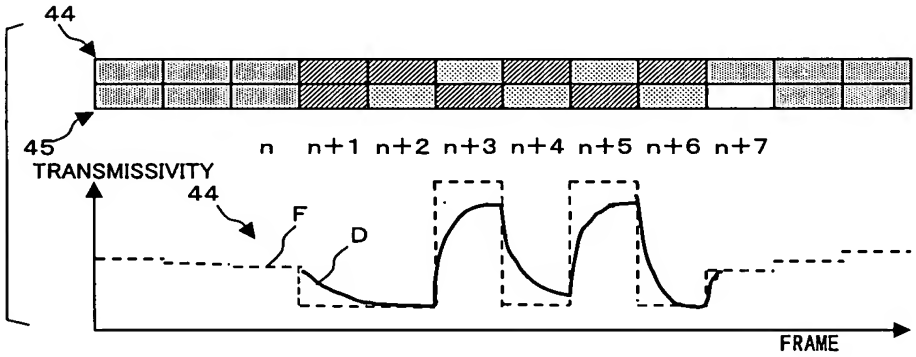


FIG.25C

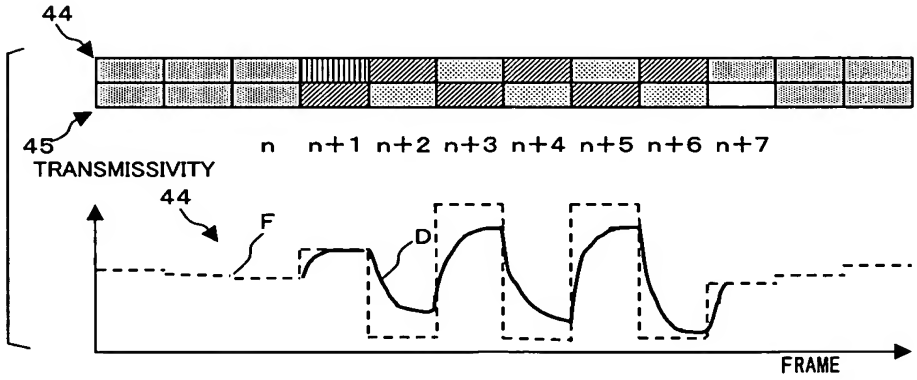


FIG.25D

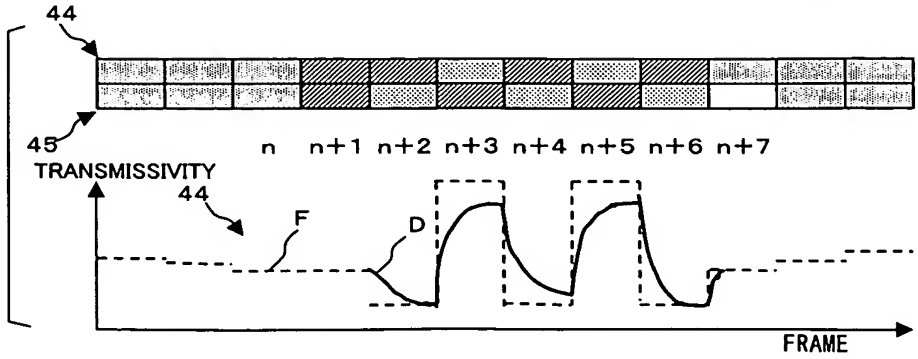


FIG.26

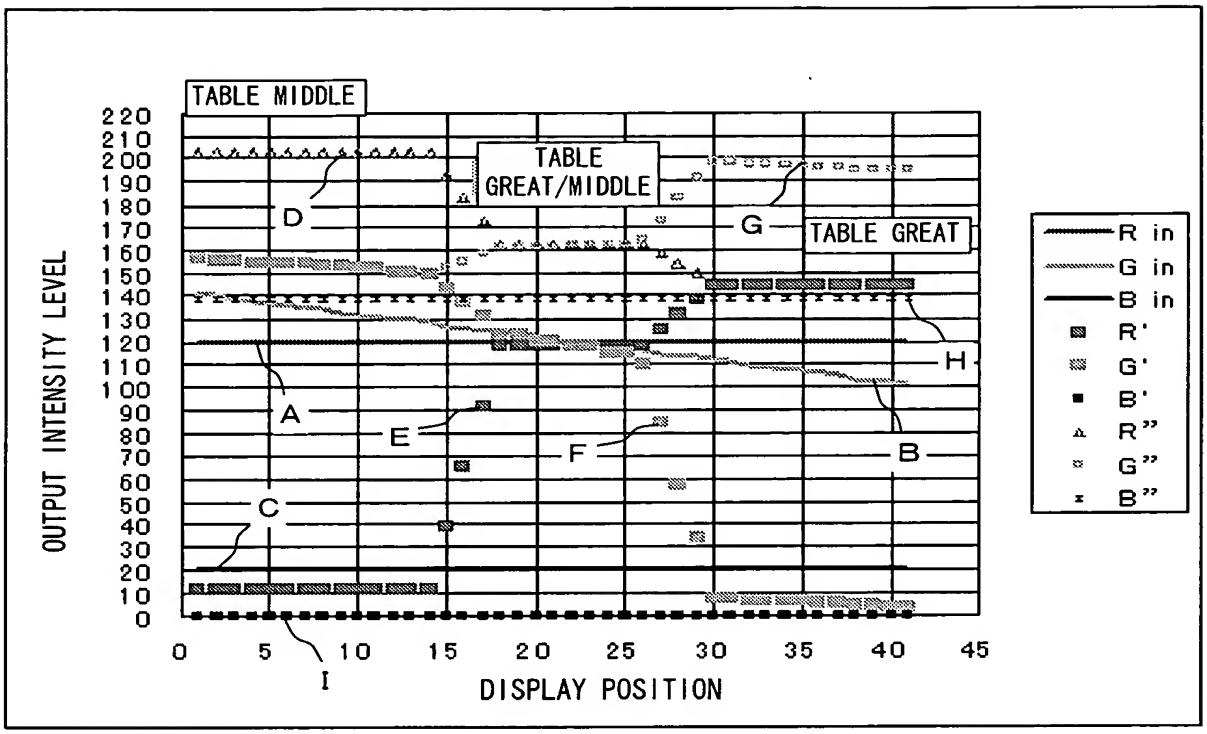


TABLE MIDDLE
TABLE GREAT/MIDDLE
TABLE GREAT
OUTPUT INTENSITY LEVEL
DISPLAY POSITION
A
B
C
D
E
F
G
H
I
R in
G in
B in
R'
G'
B'
R''
G''
B''

FIG.27A

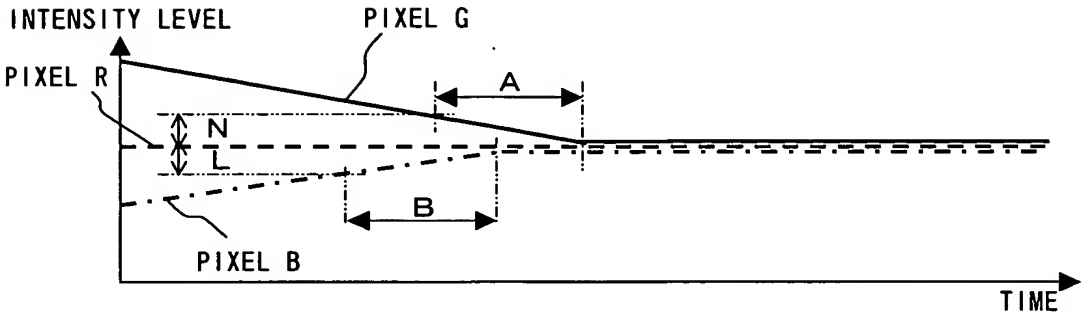


FIG.27B

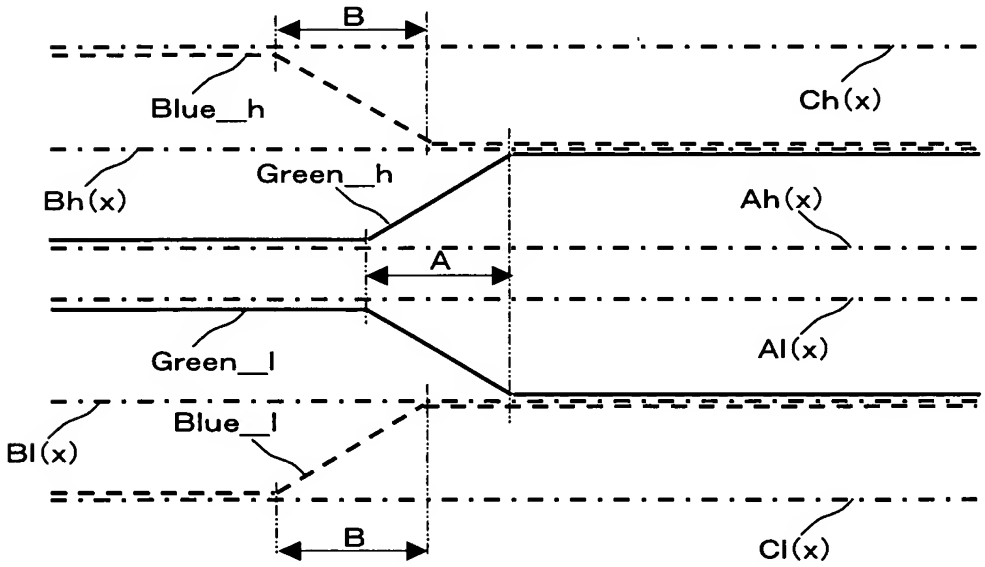


FIG.27C

N (256 LEVELS)	1	2	4	8	16	24	32	40	48	56	64	72
ABNORMALITY PREVENTIVE	×	△	△	○	○	○	○	○	○	○	○	○
HTD EFFECT	○	○	○	○	○	○	○	△	△	×	×	×

FIG.28A

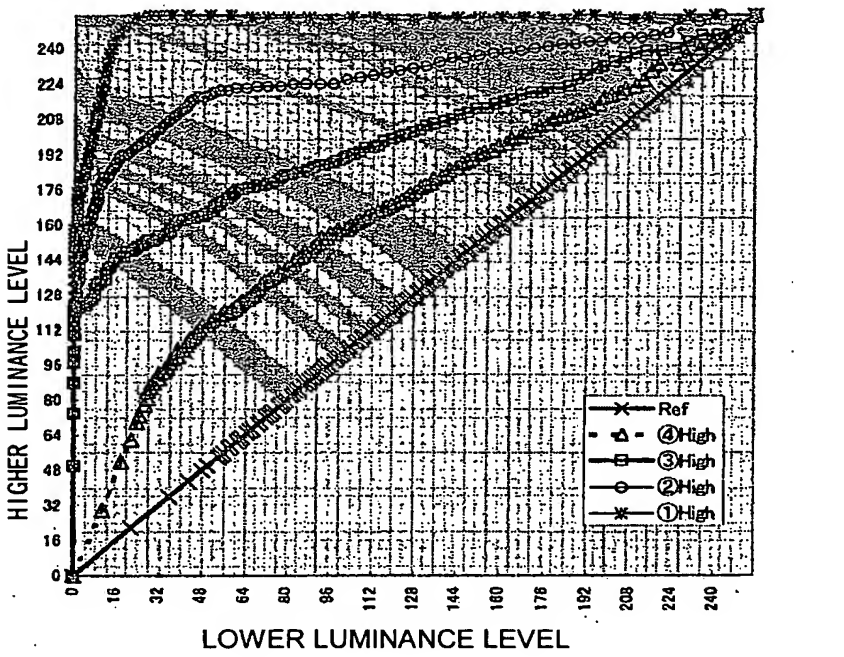


FIG.28B

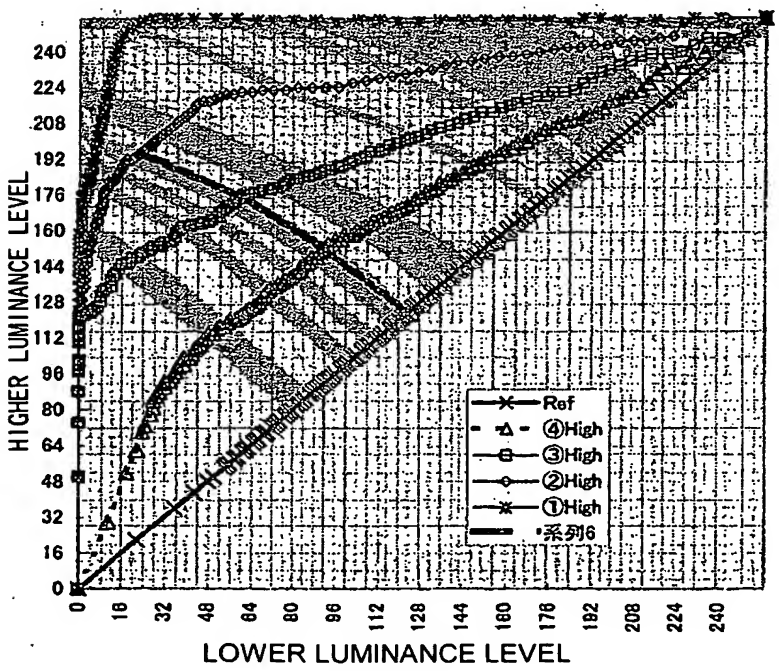


FIG.29

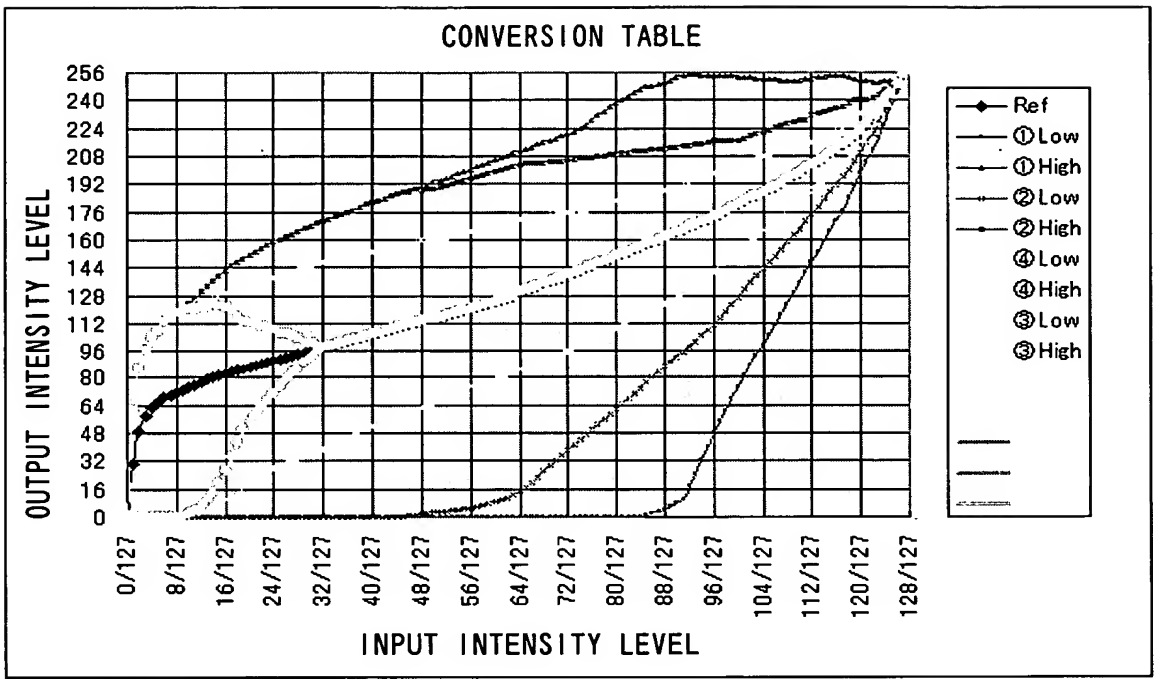

CONVERSION TABLE
OUTPUT INTENSITY LEVEL
256
240
224
208
192
176
160
144
128
112
96
80
64
48
32
16
0
0/127
8/127
16/127
24/127
32/127
40/127
48/127
56/127
64/127
72/127
80/127
88/127
96/127
104/127
112/127
120/127
128/127
INPUT INTENSITY LEVEL
Ref
①Low
①High
②Low
②High
④Low
④High
③Low
③High

FIG.30A

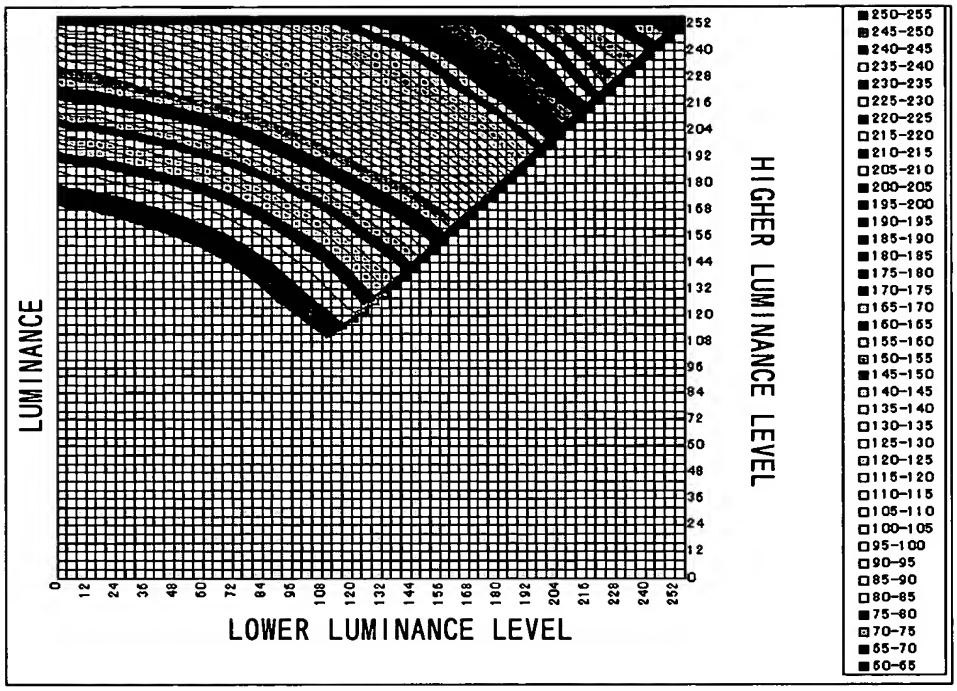


FIG.30B

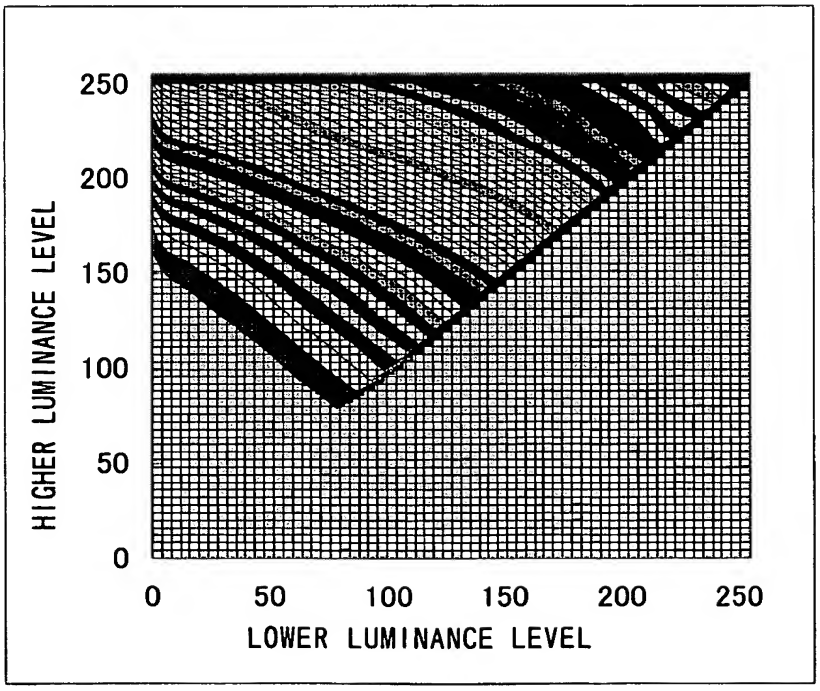


FIG.31

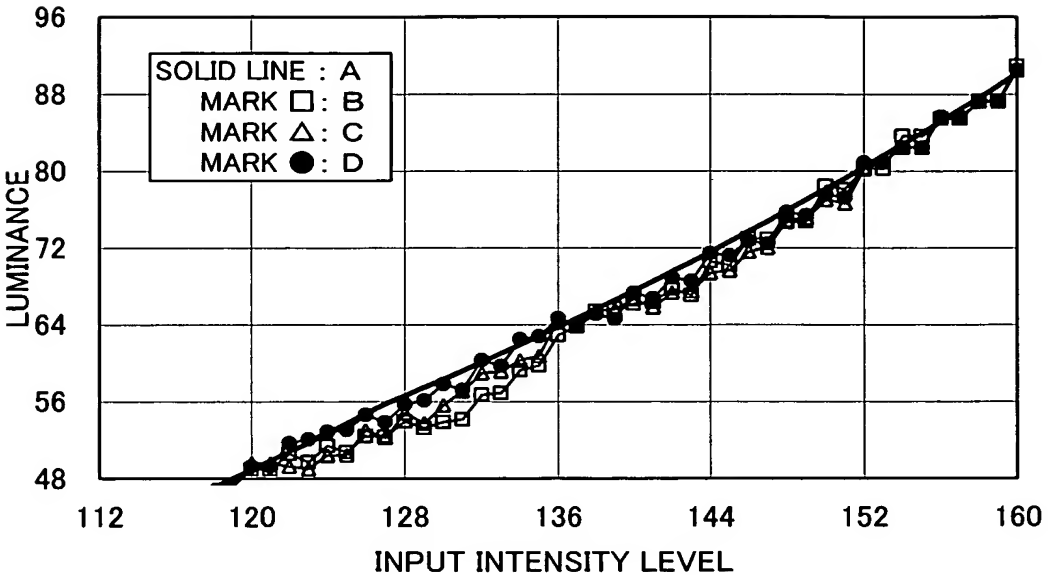

SOLID LINE : A
MARK □ : B
MARK △ : C
MARK ● : D
LUMINANCE
96
88
80
72
64
56
48
112
120
128
136
144
152
160
INPUT INTENSITY LEVEL

FIG.32A

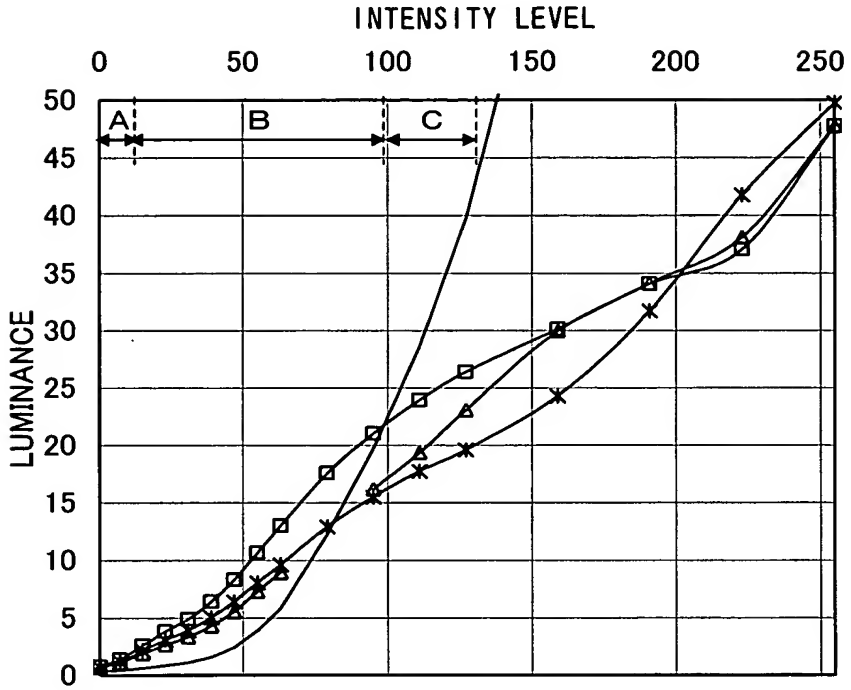


FIG.32B

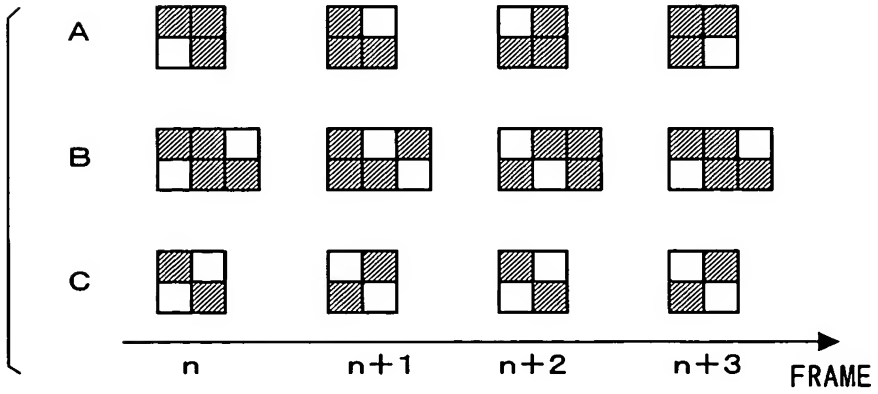


FIG.33A

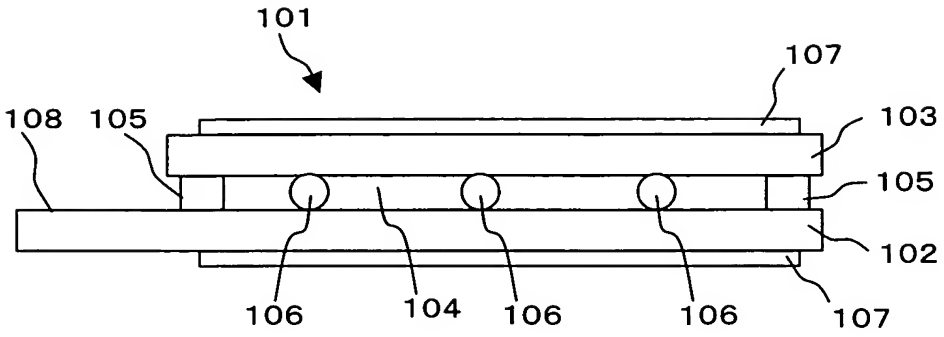


FIG.33B

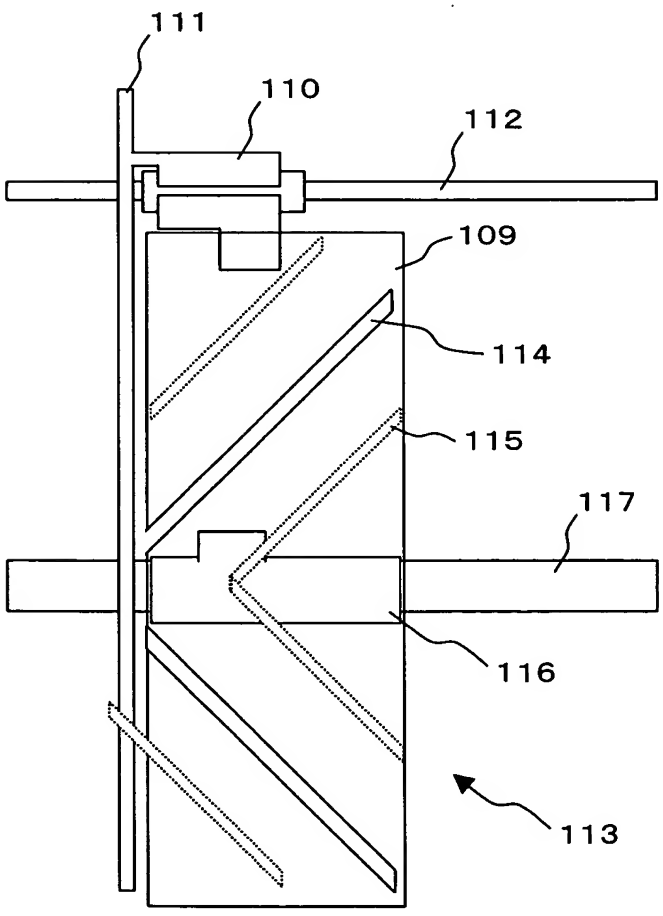


FIG.34A

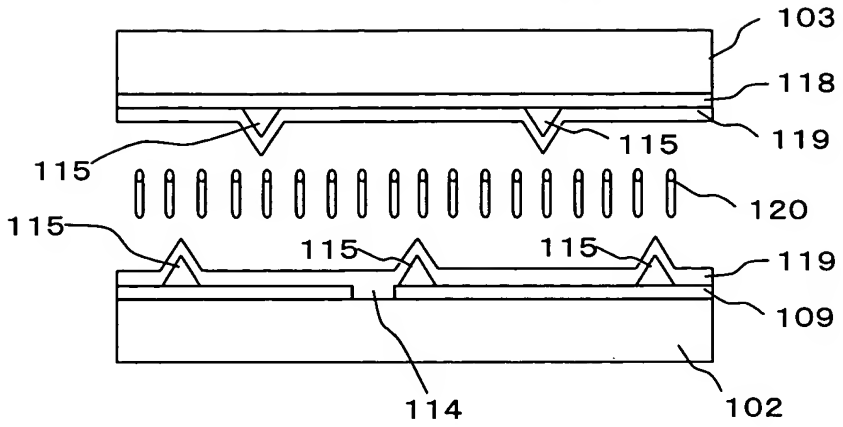


FIG.34B

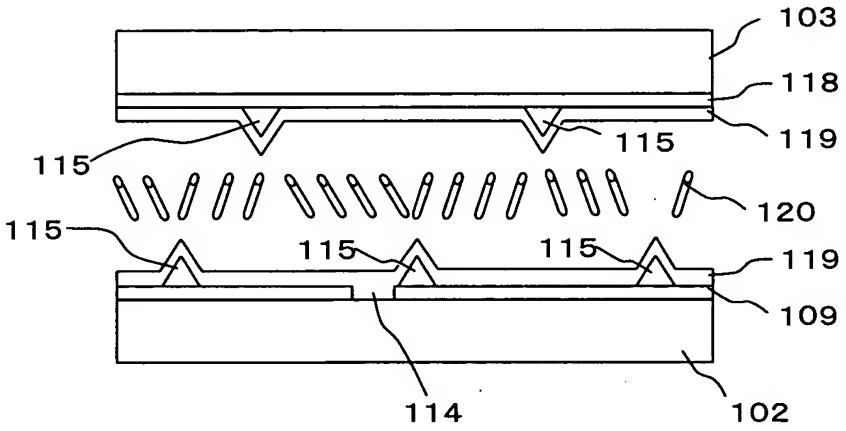


FIG.34C

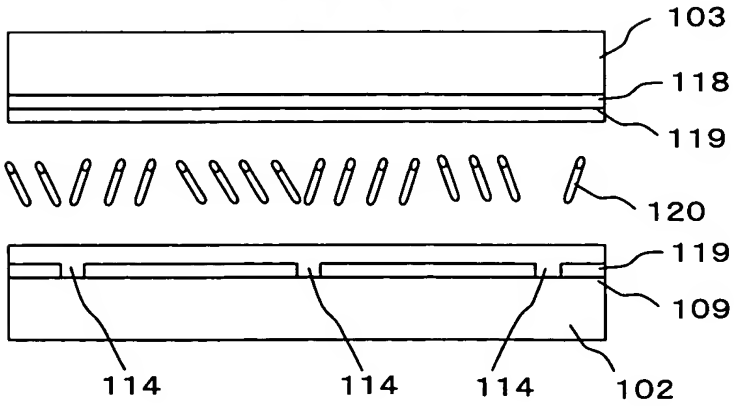


FIG.35A

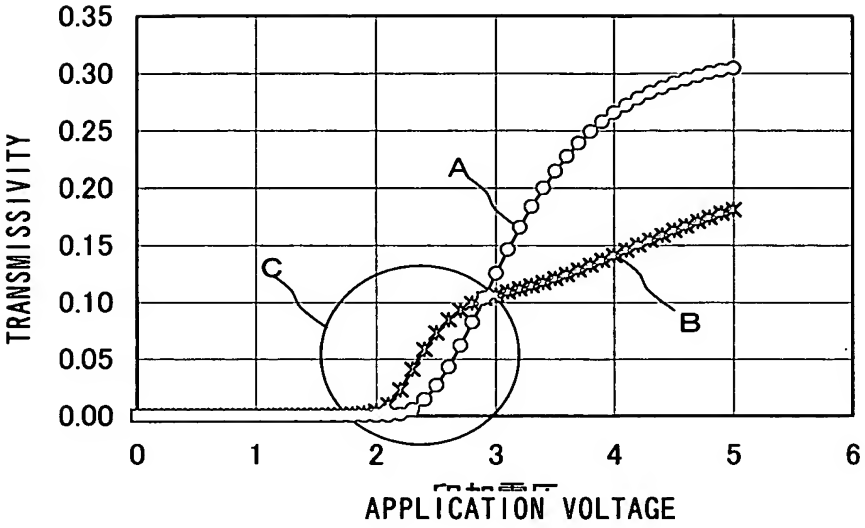


FIG.35B

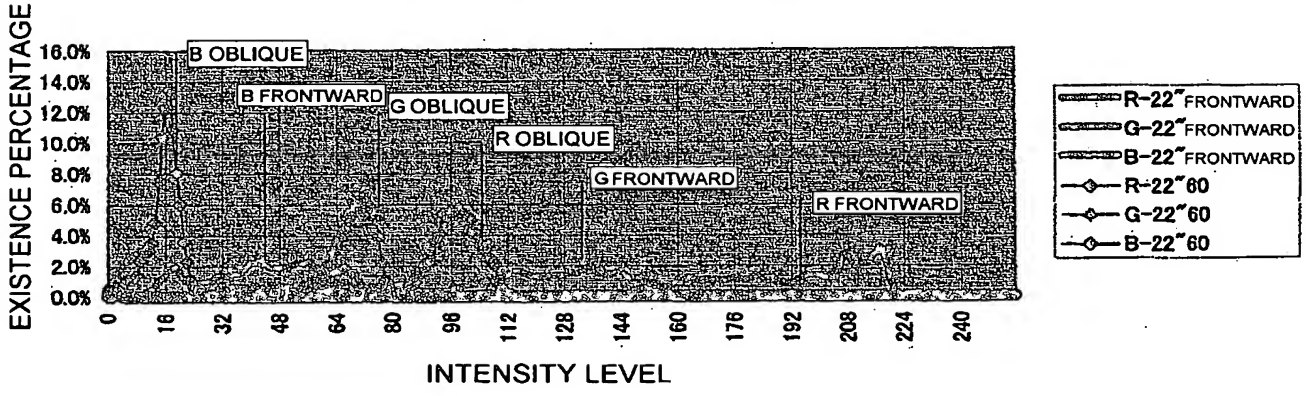


FIG.36A

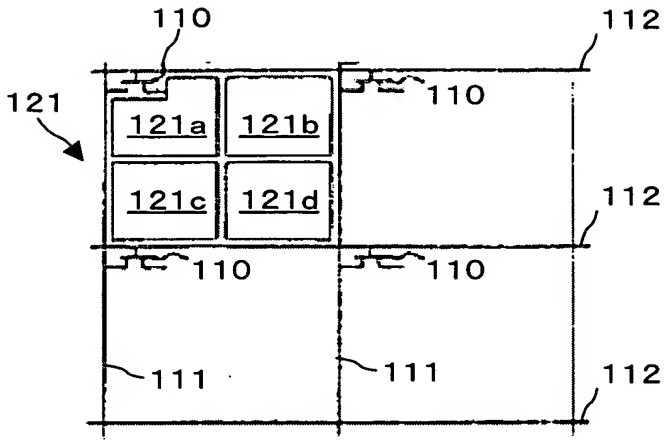


FIG.36B

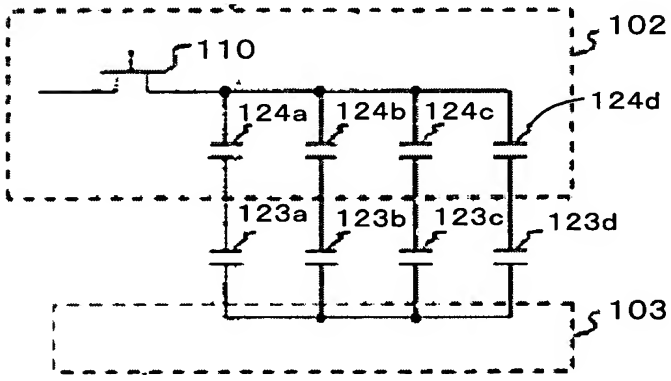


FIG.36C

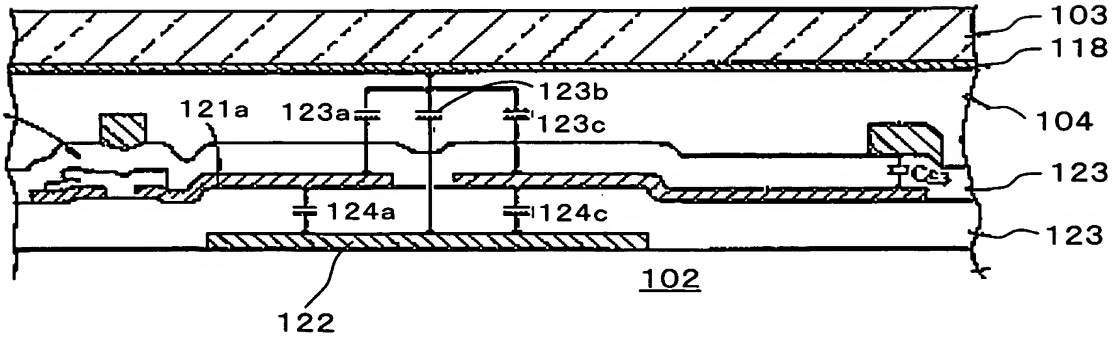


FIG.37

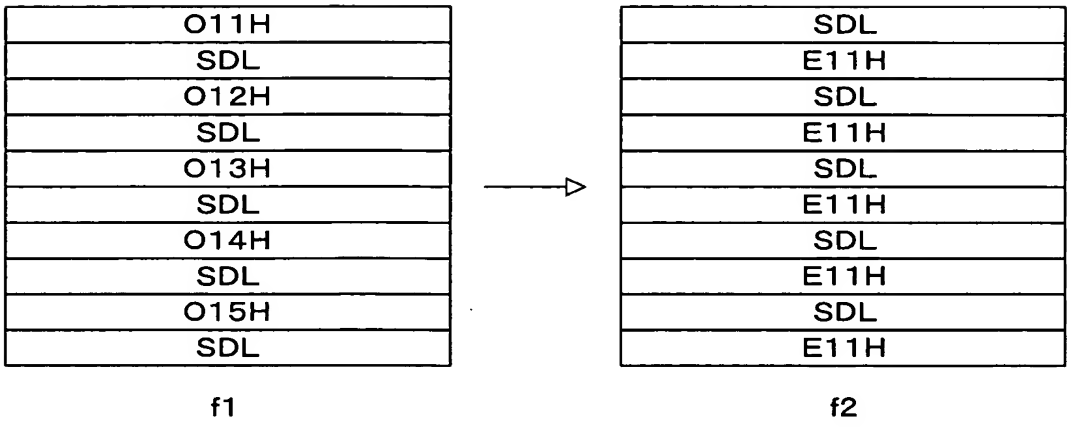

O11H
SDL
O12H
SDL
O13H
SDL
O14H
SDL
O15H
SDL
SDL
E11H
SDL
E11H
SDL
E11H
SDL
E11H
SDL
E11H
f1
f2

FIG.38

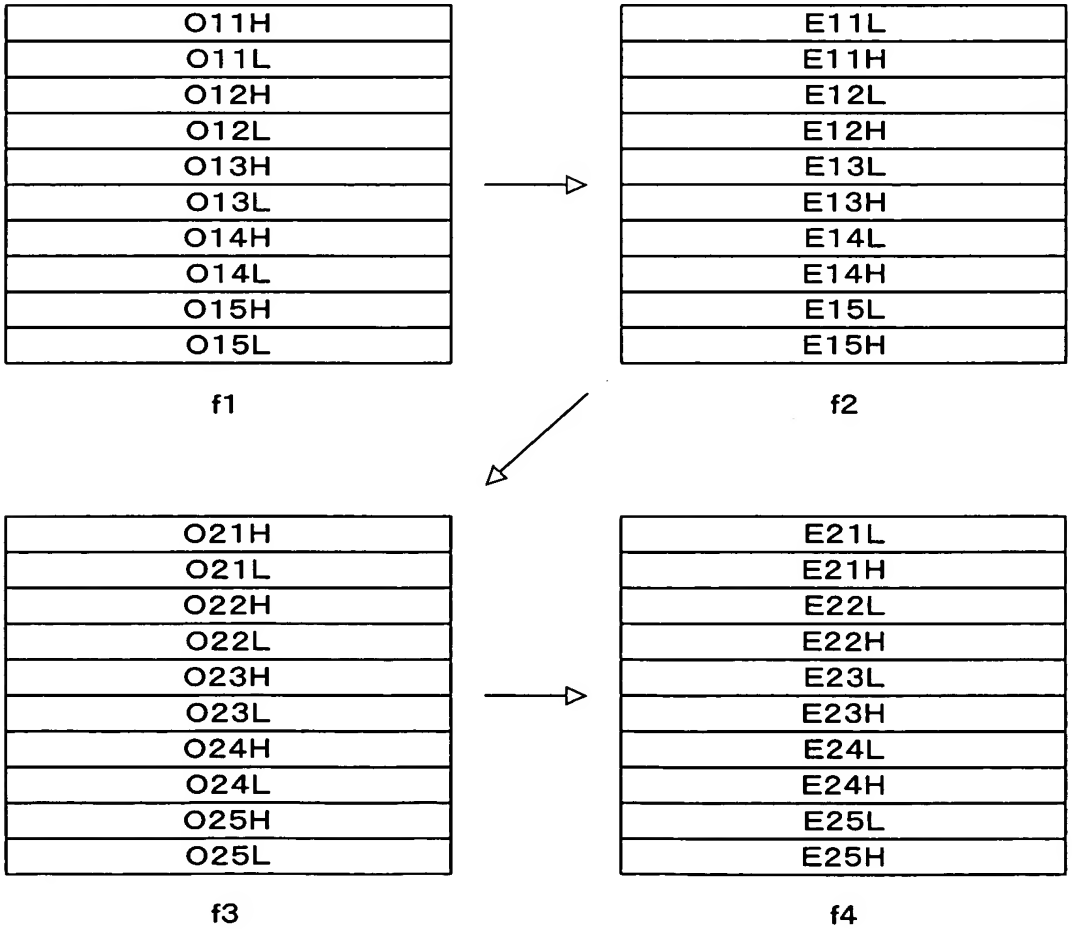

O11H
O11L
O12H
O12L
O13H
O13L
O14H
O14L
O15H
O15L
E11L
E11H
E12L
E12H
E13L
E13H
E14L
E14H
E15L
E15H
f1
f2
O21H
O21L
O22H
O22L
O23H
O23L
O24H
O24L
O25H
O25L
E21L
E21H
E22L
E22H
E23L
E23H
E24L
E24H
E25L
E25H
f3
f4

FIG.39

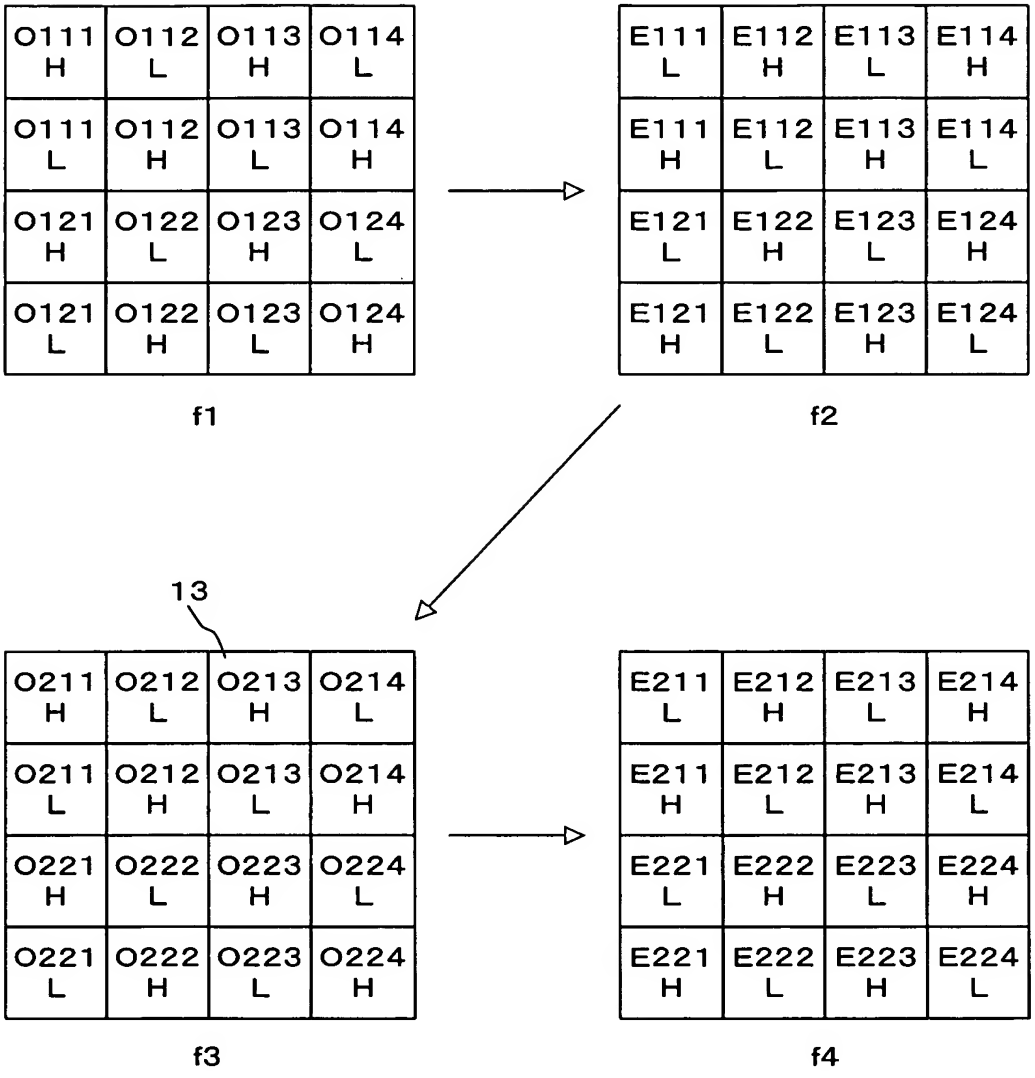

O111 H
O112 L
O113 H
O114 L
O111 L
O112 H
O113 L
O114 H
O121 H
O122 L
O123 H
O124 L
O121 L
O122 H
O123 L
O124 H
f1
E111 L
E112 H
E113 L
E114 H
E111 H
E112 L
E113 H
E114 L
E121 L
E122 H
E123 L
E124 H
E121 H
E122 L
E123 H
E124 L
f2
13
O211 H
O212 L
O213 H
O214 L
O211 L
O212 H
O213 L
O214 H
O221 H
O222 L
O223 H
O224 L
O221 L
O222 H
O223 L
O224 H
f3
E211 L
E212 H
E213 L
E214 H
E211 H
E212 L
E213 H
E214 L
E221 L
E222 H
E223 L
E224 H
E221 H
E222 L
E223 H
E224 L
f4

FIG.40

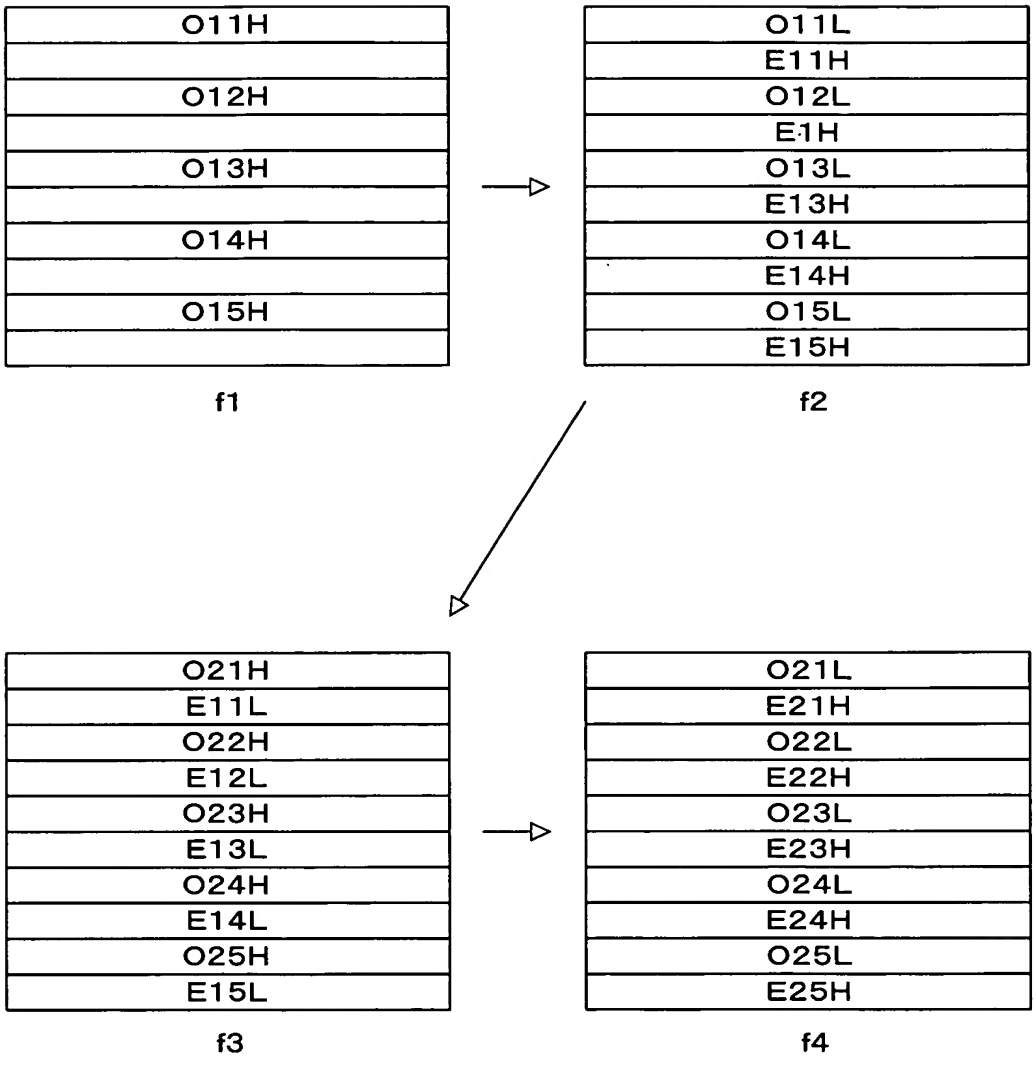

O11H
O12H
O13H
O14H
O15H
f1
O11L
E11H
O12L
E1H
O13L
E13H
O14L
E14H
O15L
E15H
f2
O21H
E11L
O22H
E12L
O23H
E13L
O24H
E14L
O25H
E15L
f3
O21L
E21H
O22L
E22H
O23L
E23H
O24L
E24H
O25L
E25H
f4

FIG.41

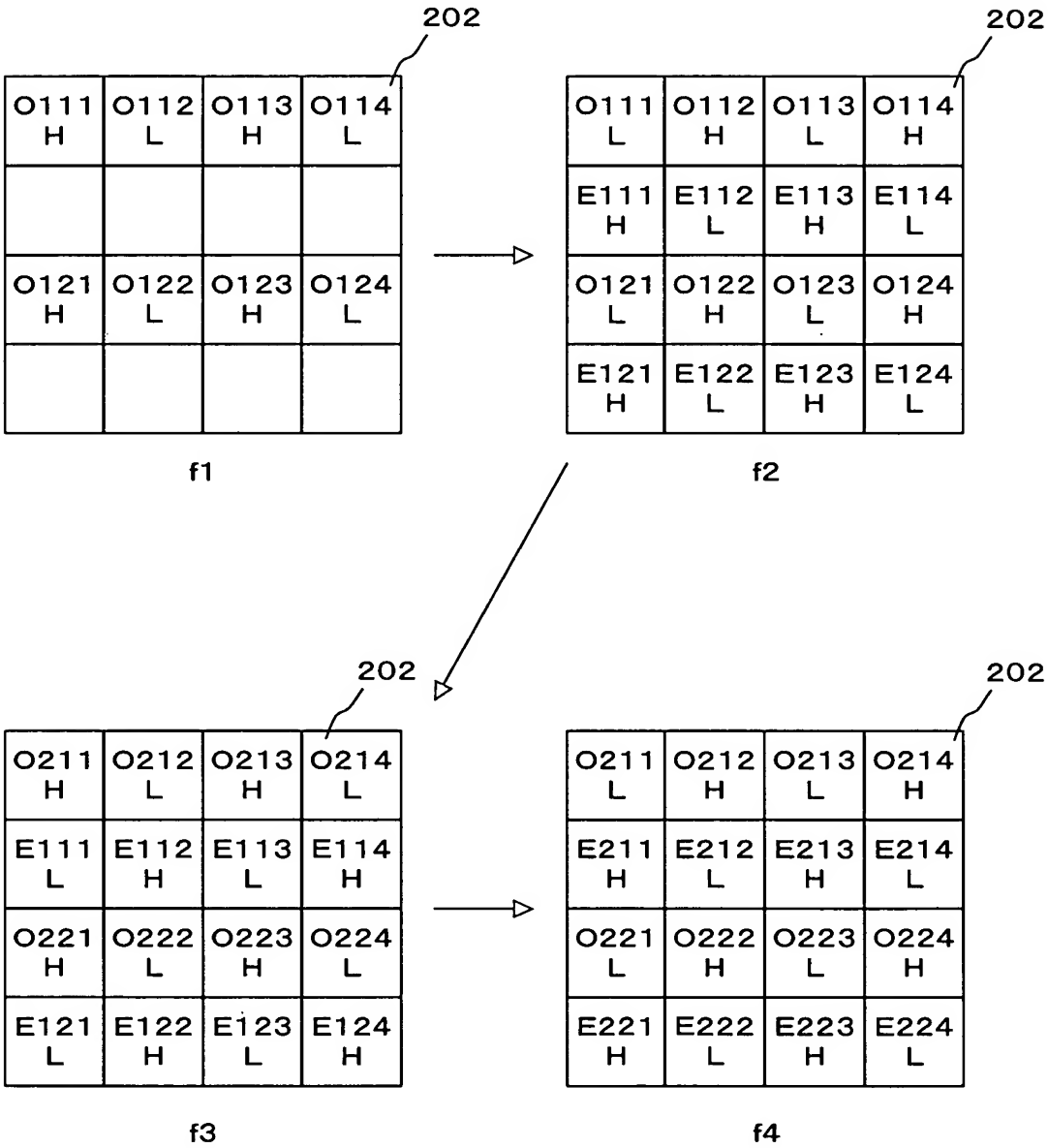

202
O111 H
O112 L
O113 H
O114 L
O121 H
O122 L
O123 H
O124 L
f1
202
O111 L
O112 H
O113 L
O114 H
E111 H
E112 L
E113 H
E114 L
O121 L
O122 H
O123 L
O124 H
E121 H
E122 L
E123 H
E124 L
f2
202
O211 H
O212 L
O213 H
O214 L
E111 L
E112 H
E113 L
E114 H
O221 H
O222 L
O223 H
O224 L
E121 L
E122 H
E123 L
E124 H
f3
202
O211 L
O212 H
O213 L
O214 H
E211 H
E212 L
E213 H
E214 L
O221 L
O222 H
O223 L
O224 H
E221 H
E222 L
E223 H
E224 L
f4

FIG.42

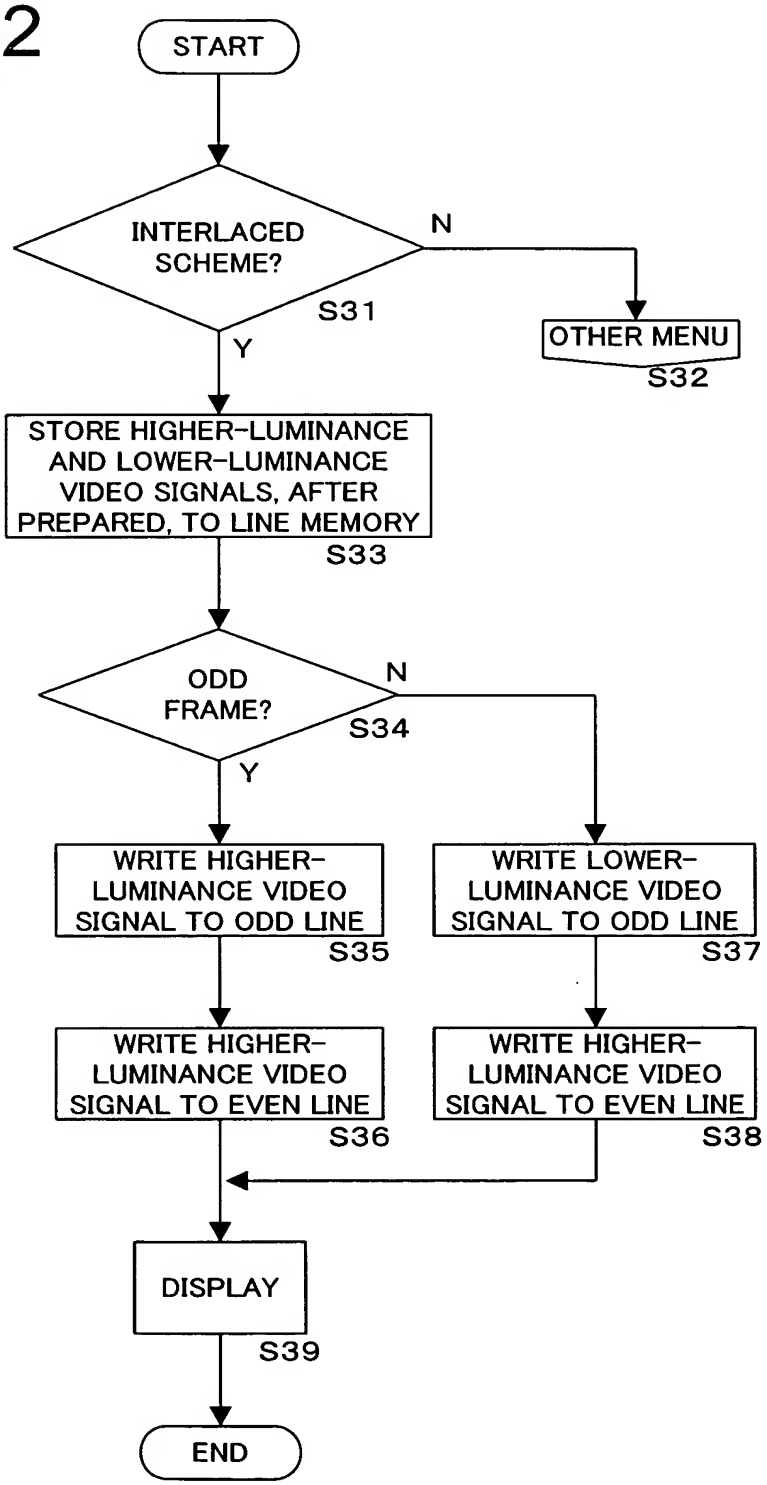

START
INTERLACED SCHEME?
S31
N
Y
OTHER MENU
S32
STORE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS, AFTER PREPARED, TO LINE MEMORY
S33
ODD FRAME?
S34
N
Y
WRITE HIGHER-LUMINANCE VIDEO SIGNAL TO ODD LINE
S35
WRITE LOWER-LUMINANCE VIDEO SIGNAL TO ODD LINE
S37
WRITE HIGHER-LUMINANCE VIDEO SIGNAL TO EVEN LINE
S36
WRITE HIGHER-LUMINANCE VIDEO SIGNAL TO EVEN LINE
S38
DISPLAY
S39
END

FIG.43

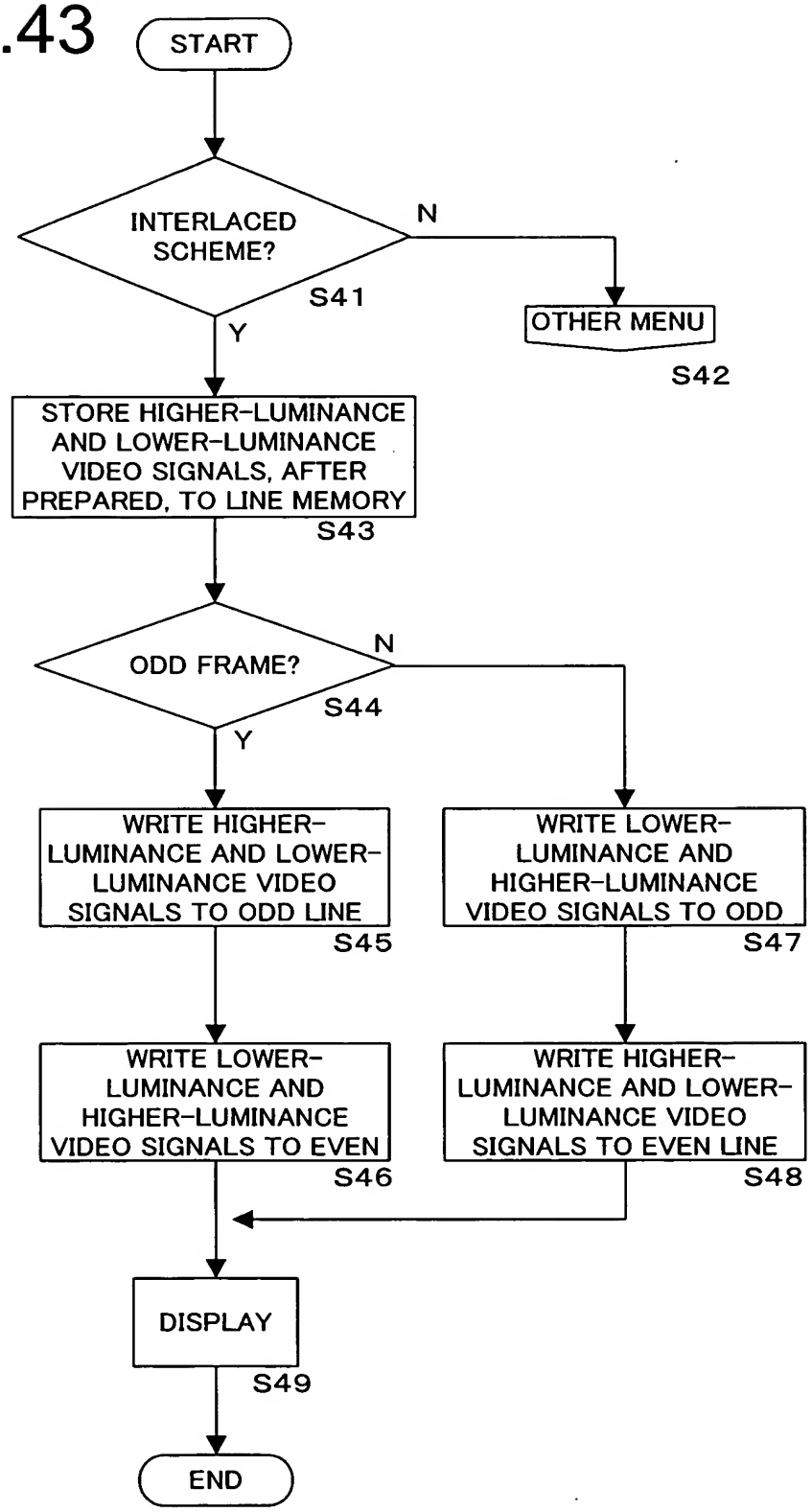

START
INTERLACED SCHEME?
S41
N
Y
OTHER MENU
S42
STORE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS, AFTER PREPARED, TO LINE MEMORY
S43
ODD FRAME?
S44
N
Y
WRITE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS TO ODD LINE
S45
WRITE LOWER-LUMINANCE AND HIGHER-LUMINANCE VIDEO SIGNALS TO EVEN
S46
WRITE LOWER-LUMINANCE AND HIGHER-LUMINANCE VIDEO SIGNALS TO ODD
S47
WRITE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS TO EVEN LINE
S48
DISPLAY
S49
END

FIG.44

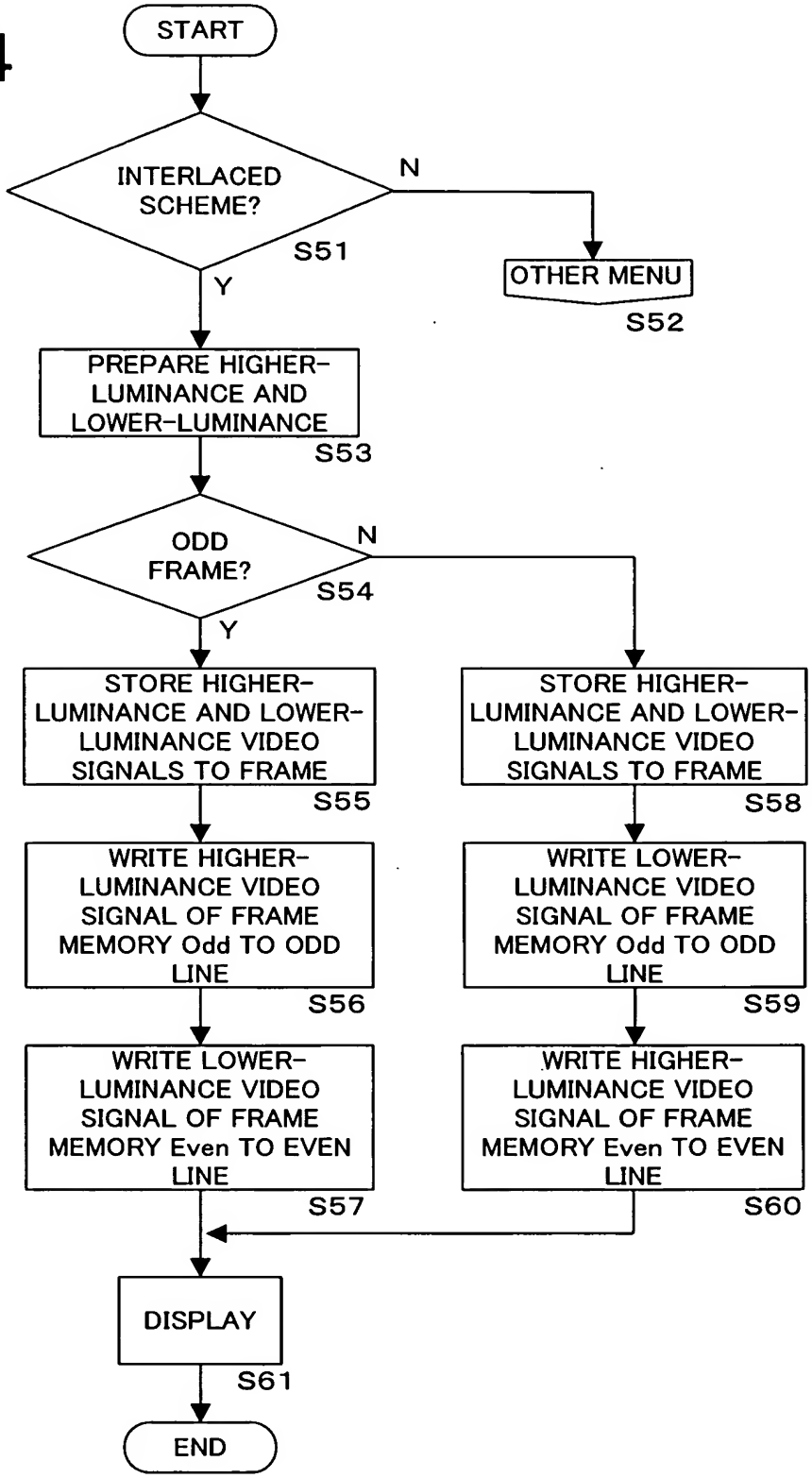

START
INTERLACED SCHEME?
S51
N
Y
OTHER MENU
S52
PREPARE HIGHER-LUMINANCE AND LOWER-LUMINANCE
S53
ODD FRAME?
S54
N
Y
STORE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS TO FRAME
S55
WRITE HIGHER-LUMINANCE VIDEO SIGNAL OF FRAME MEMORY Odd TO ODD LINE
S56
WRITE LOWER-LUMINANCE VIDEO SIGNAL OF FRAME MEMORY Even TO EVEN LINE
S57
STORE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS TO FRAME
S58
WRITE LOWER-LUMINANCE VIDEO SIGNAL OF FRAME MEMORY Odd TO ODD LINE
S59
WRITE HIGHER-LUMINANCE VIDEO SIGNAL OF FRAME MEMORY Even TO EVEN LINE
S60
DISPLAY
S61
END

FIG.45

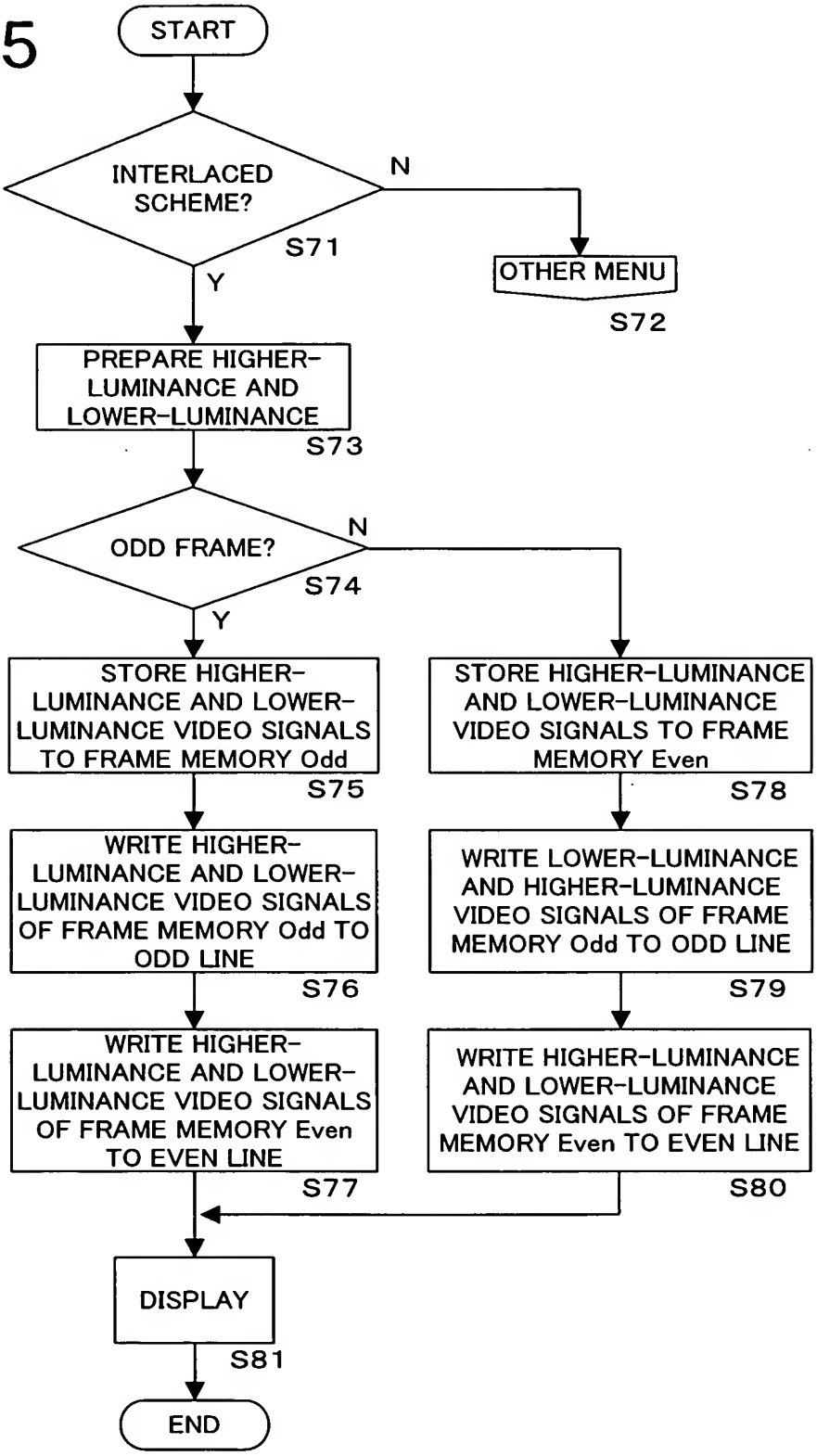

START
INTERLACED SCHEME?
S71
N
Y
OTHER MENU
S72
PREPARE HIGHER-LUMINANCE AND LOWER-LUMINANCE
S73
ODD FRAME?
S74
N
Y
STORE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS TO FRAME MEMORY Odd
S75
WRITE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS OF FRAME MEMORY Odd TO ODD LINE
S76
WRITE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS OF FRAME MEMORY Even TO EVEN LINE
S77
STORE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS TO FRAME MEMORY Even
S78
WRITE LOWER-LUMINANCE AND HIGHER-LUMINANCE VIDEO SIGNALS OF FRAME MEMORY Odd TO ODD LINE
S79
WRITE HIGHER-LUMINANCE AND LOWER-LUMINANCE VIDEO SIGNALS OF FRAME MEMORY Even TO EVEN LINE
S80
DISPLAY
S81
END

FIG.46A

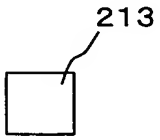


FIG.46B

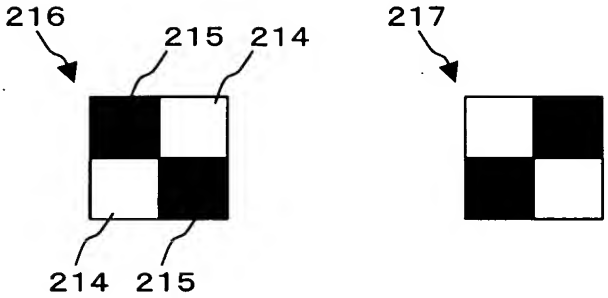


FIG.46C

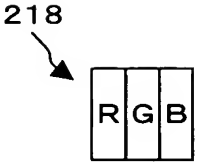


FIG.46D

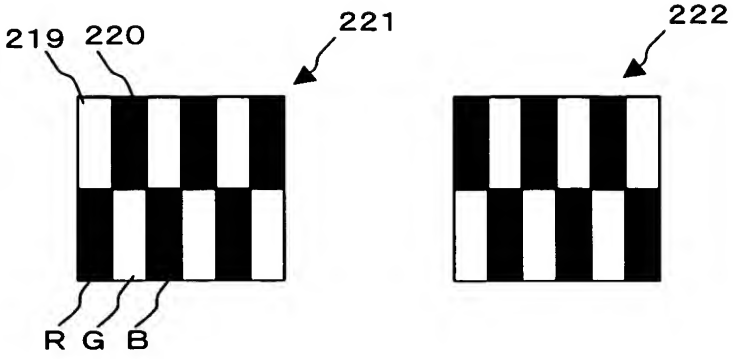


FIG.47

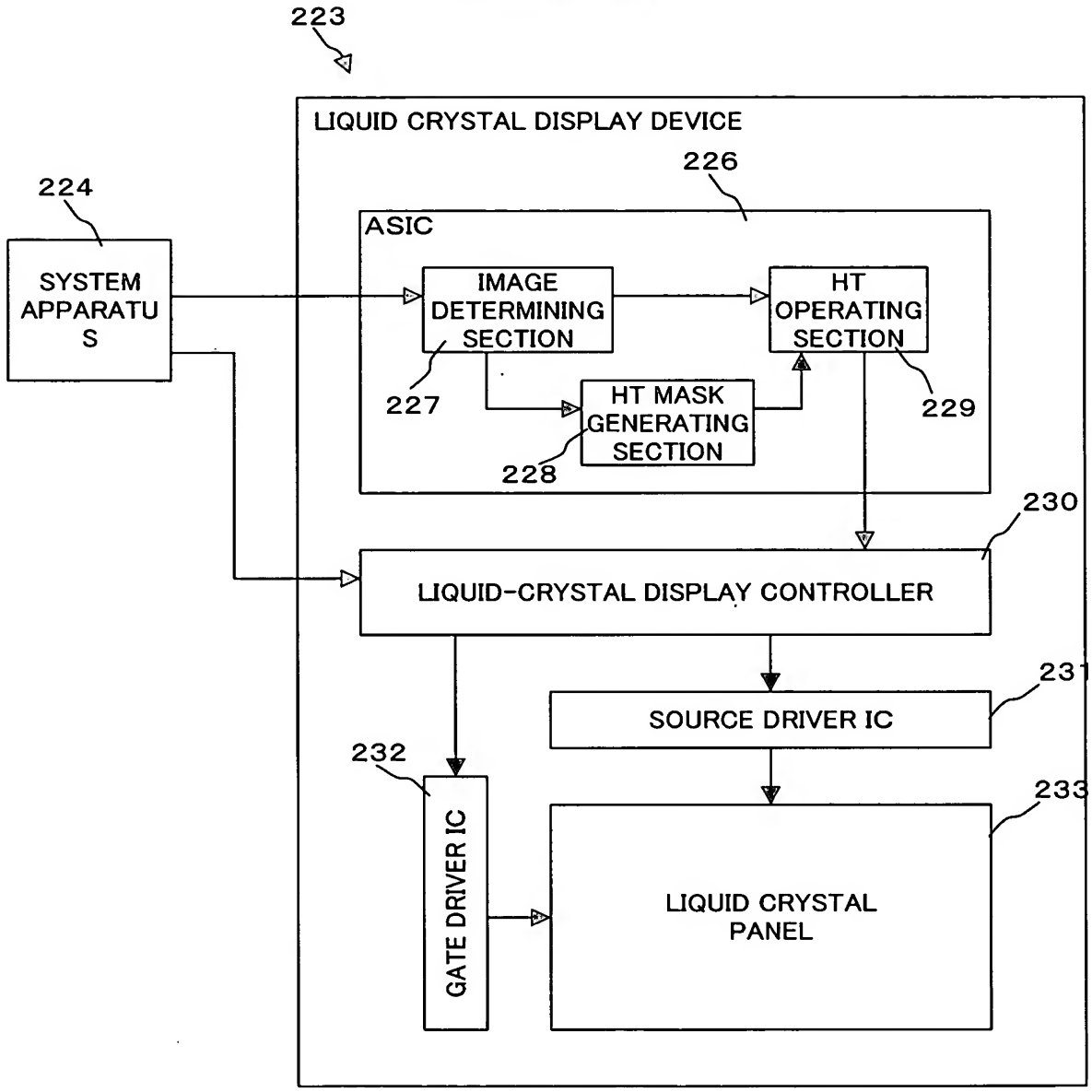

223
LIQUID CRYSTAL DISPLAY DEVICE
226
224
ASIC
SYSTEM APPARATUS
IMAGE DETERMINING SECTION
HT OPERATING SECTION
227
HT MASK GENERATING SECTION
229
228
230
LIQUID-CRYSTAL DISPLAY CONTROLLER
231
SOURCE DRIVER IC
232
233
GATE DRIVER IC
LIQUID CRYSTAL PANEL

FIG.48

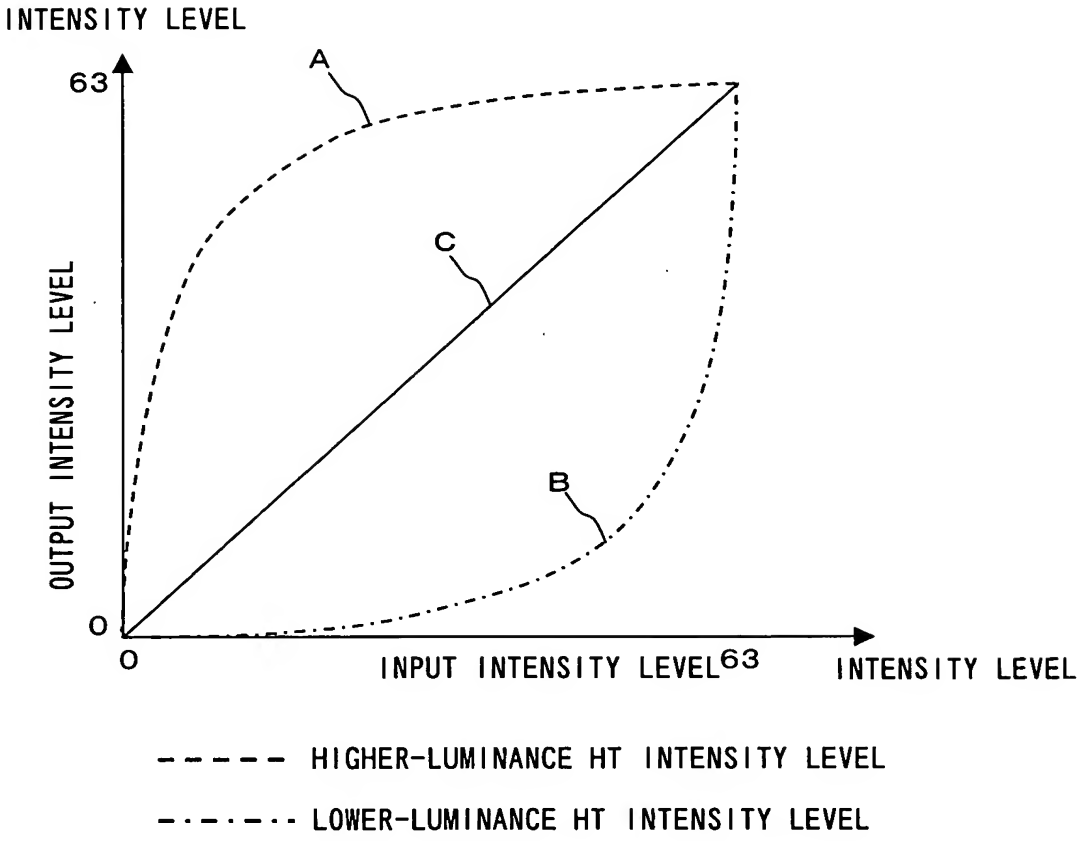

INTENSITY LEVEL
63
A
C
B
OUTPUT INTENSITY LEVEL
0
0
INPUT INTENSITY LEVEL
63
INTENSITY LEVEL
HIGHER-LUMINANCE HT INTENSITY LEVEL
LOWER-LUMINANCE HT INTENSITY LEVEL

FIG.49A

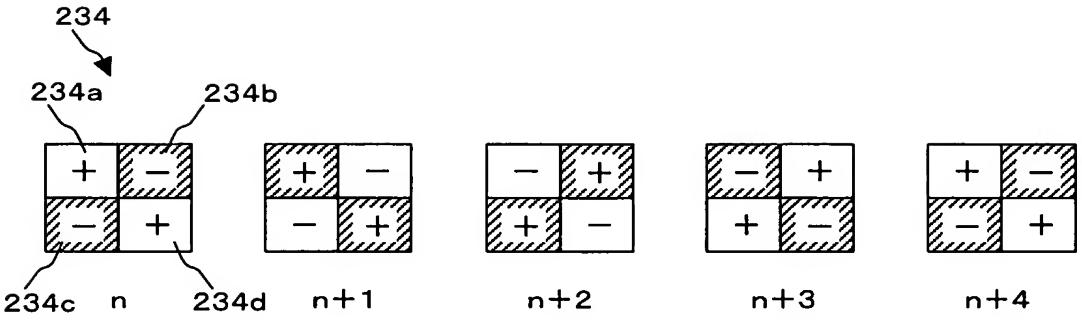


FIG.49B

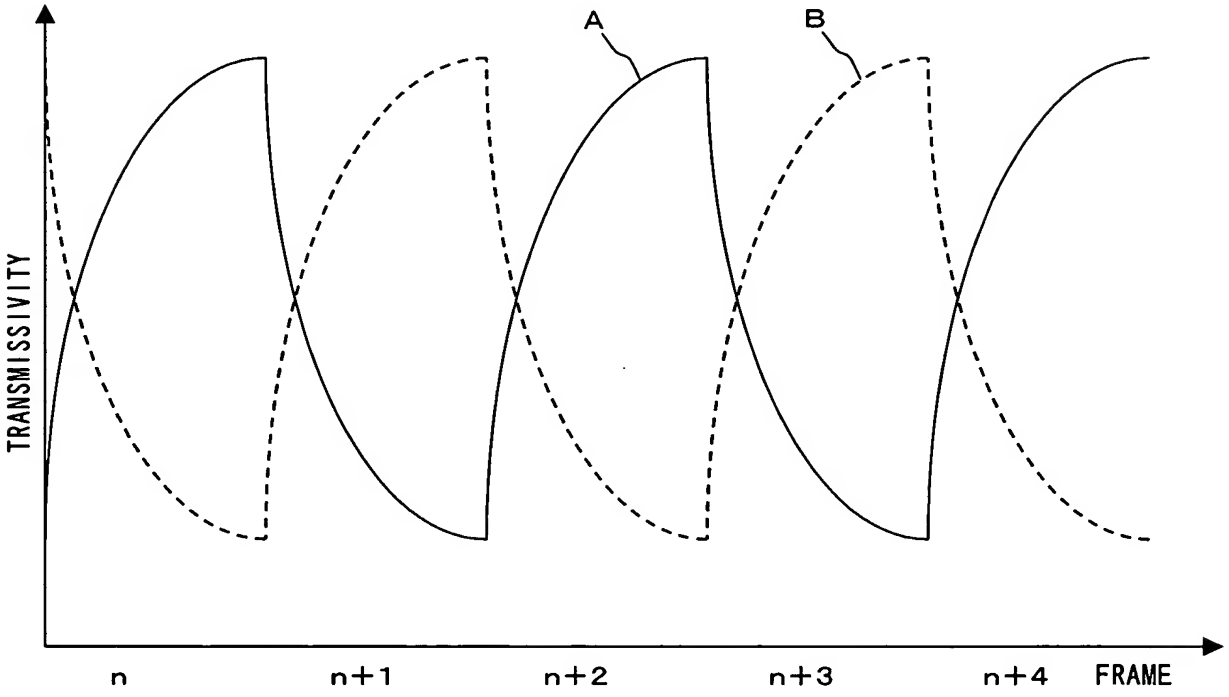


FIG.50A

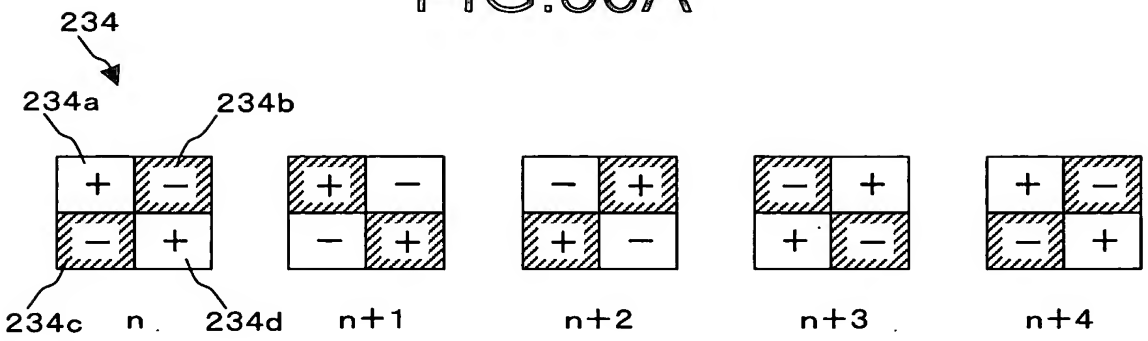


FIG.50B

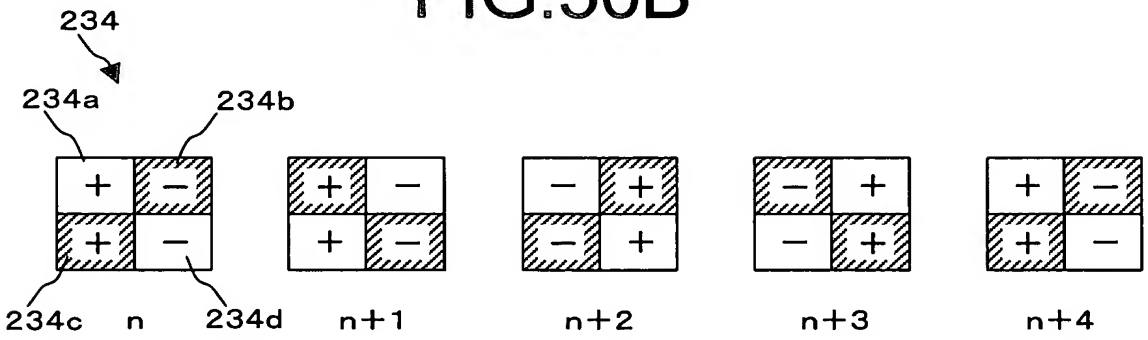


FIG.50C

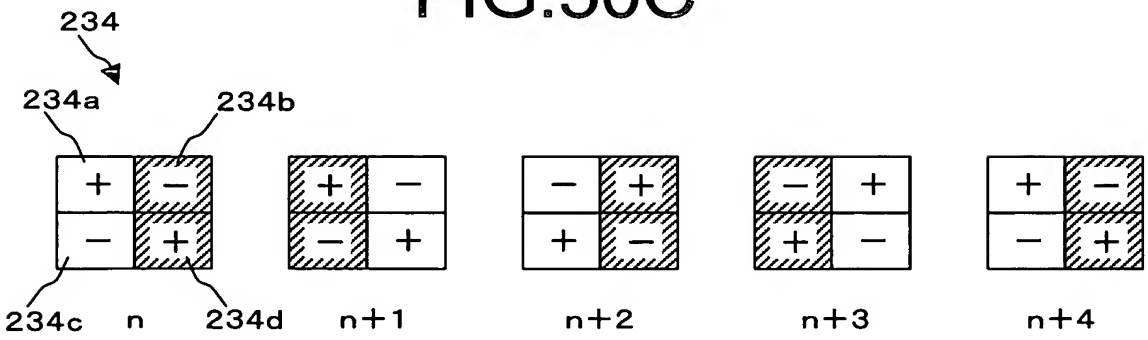


FIG.51A

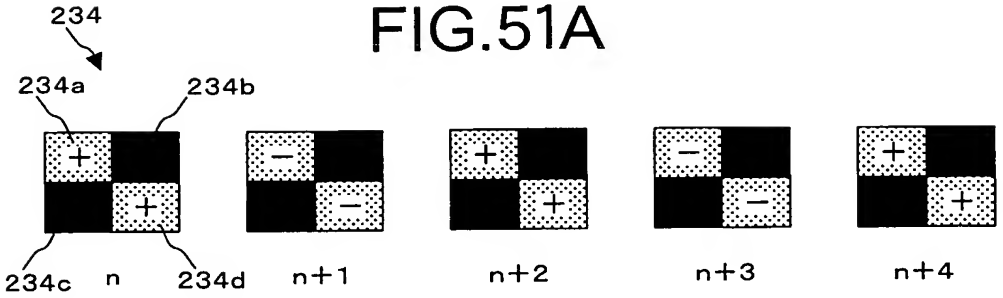


FIG.51B

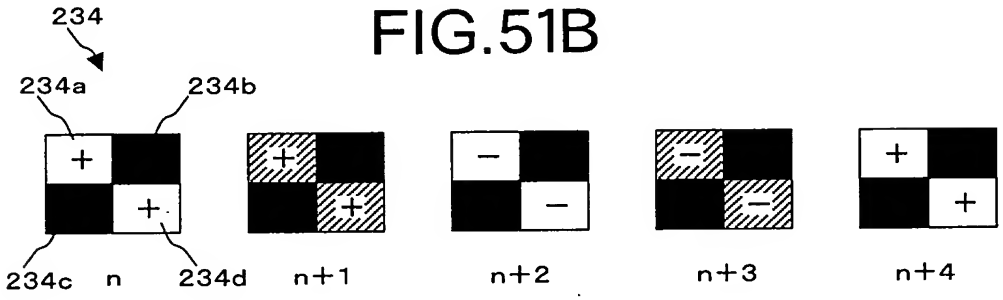


FIG.51C

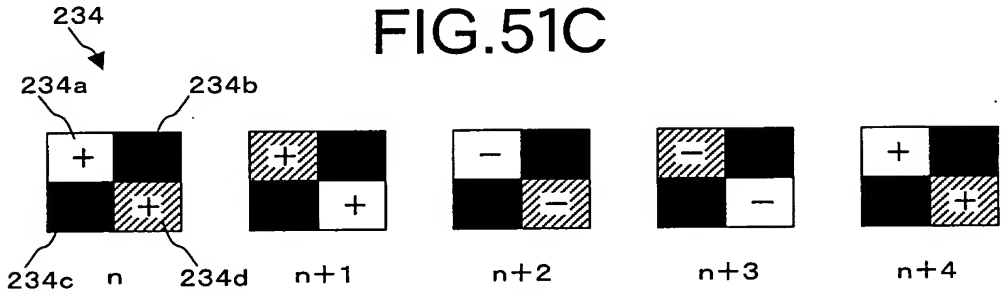


FIG.51D

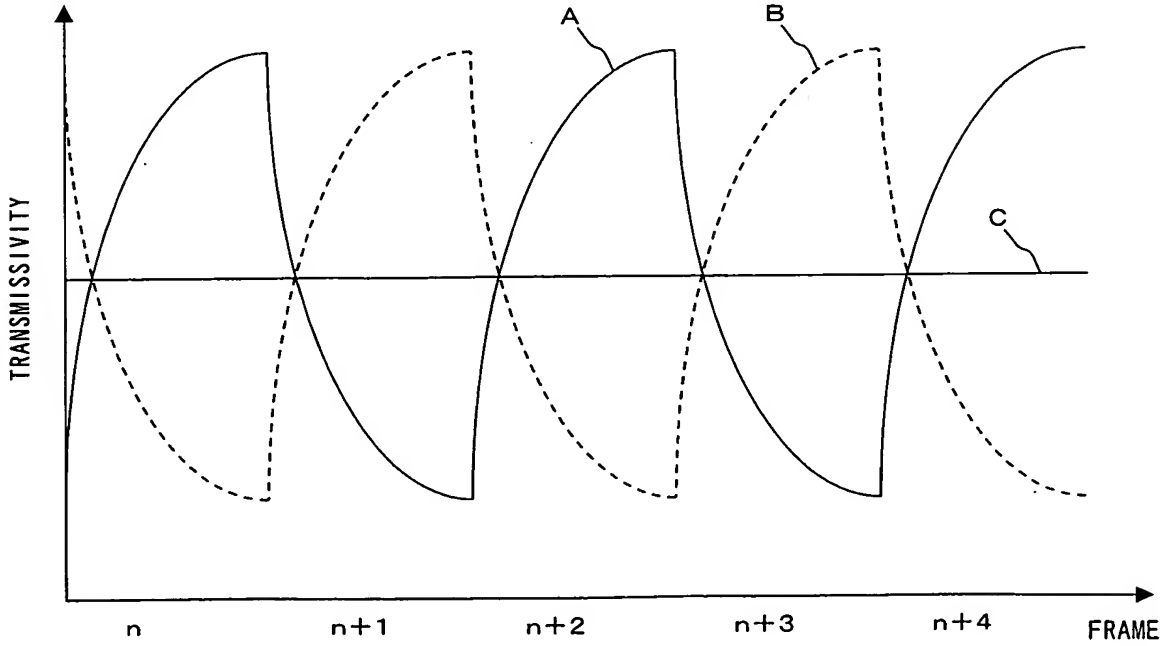


FIG.52

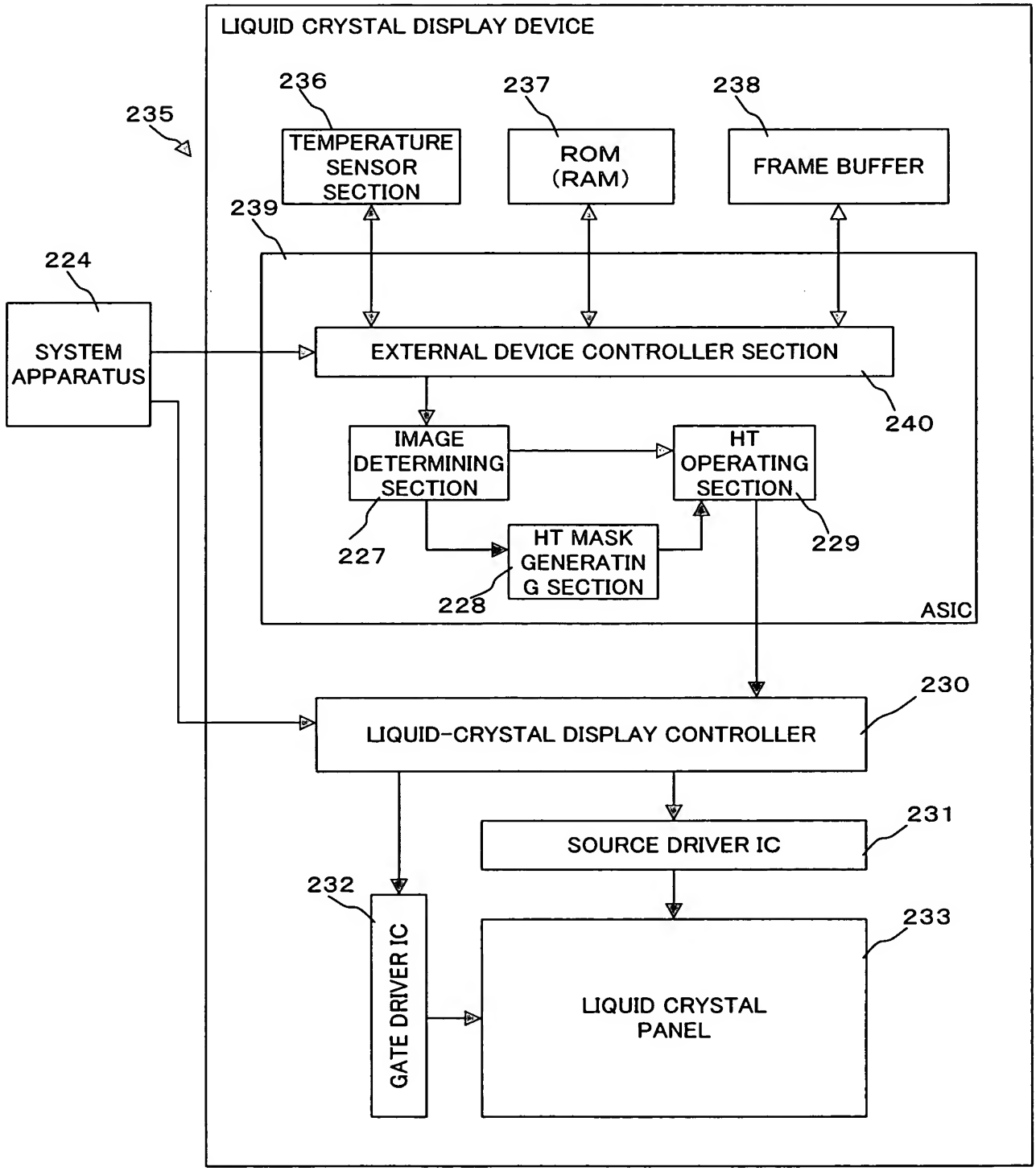

LIQUID CRYSTAL DISPLAY DEVICE
235
236
TEMPERATURE SENSOR SECTION
237
ROM (RAM)
238
FRAME BUFFER
239
224
SYSTEM APPARATUS
EXTERNAL DEVICE CONTROLLER SECTION
240
IMAGE DETERMINING SECTION
HT OPERATING SECTION
227
HT MASK GENERATIN G SECTION
229
228
ASIC
230
LIQUID-CRYSTAL DISPLAY CONTROLLER
231
SOURCE DRIVER IC
232
GATE DRIVER IC
233
LIQUID CRYSTAL PANEL

FIG.53A

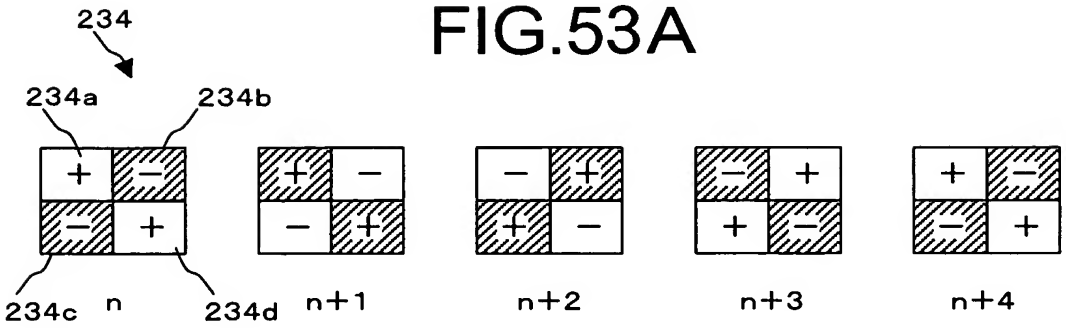


FIG.53B

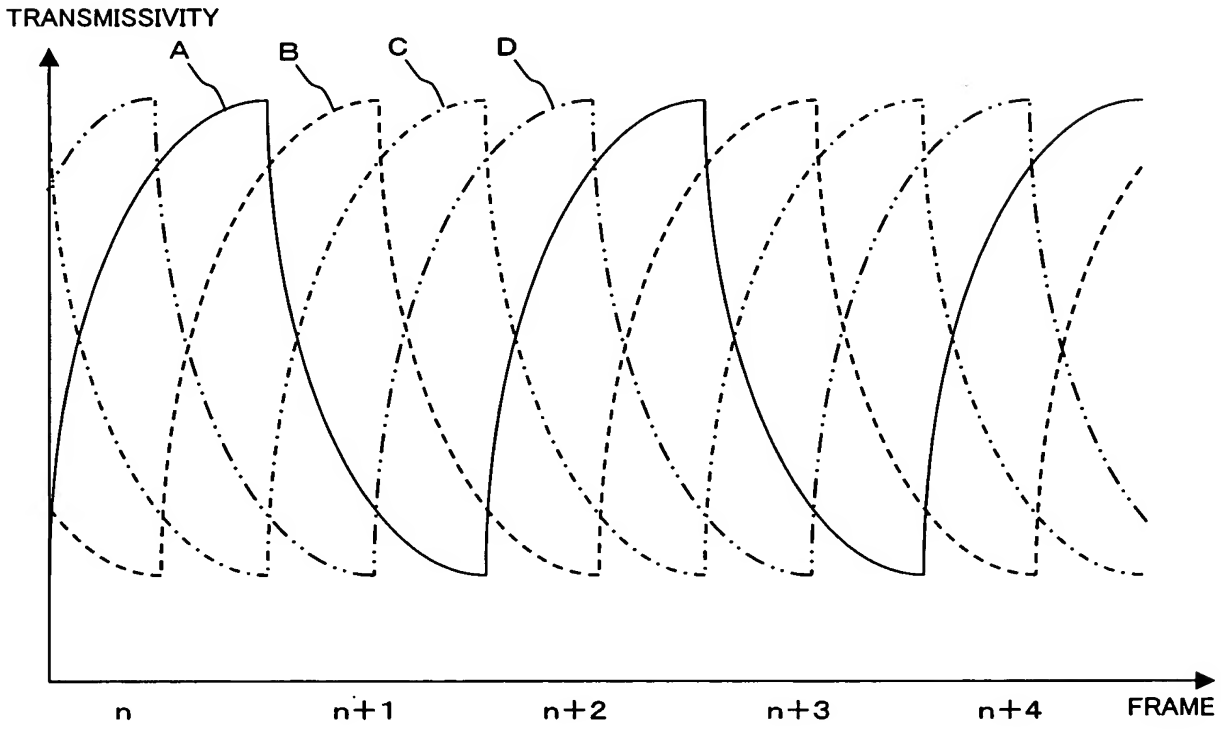


FIG.54A

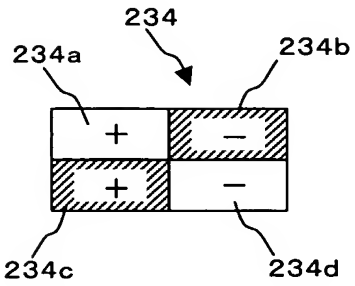


FIG.54B

FIG.55A

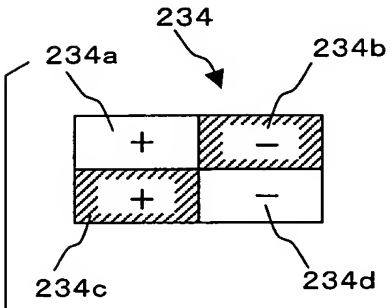


FIG.55B

FIG.56A

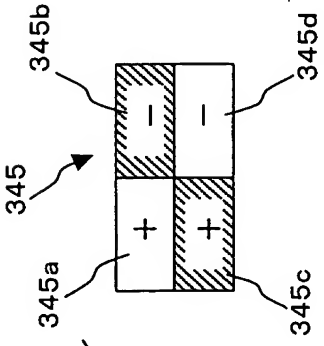


FIG.56B

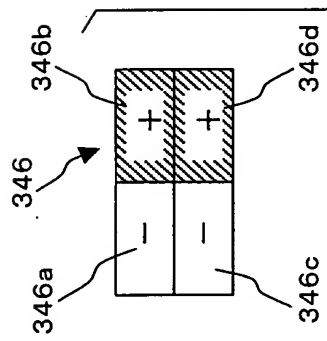


FIG.56C

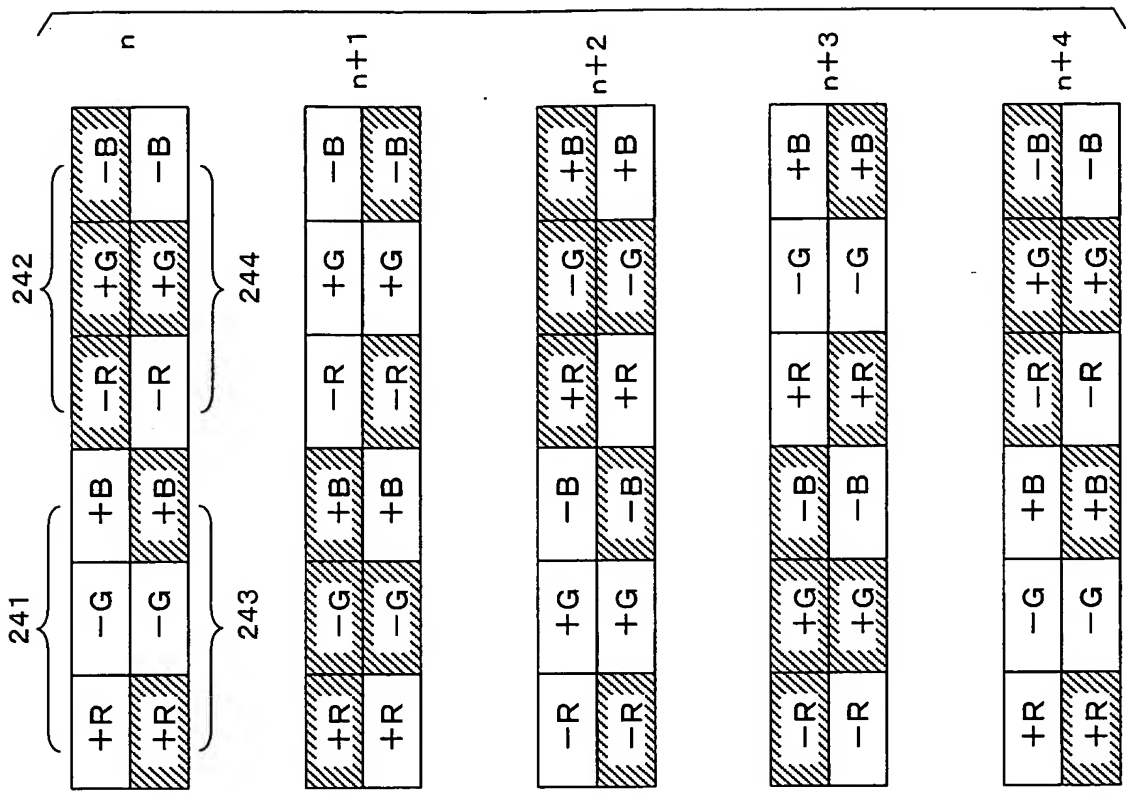


FIG.57

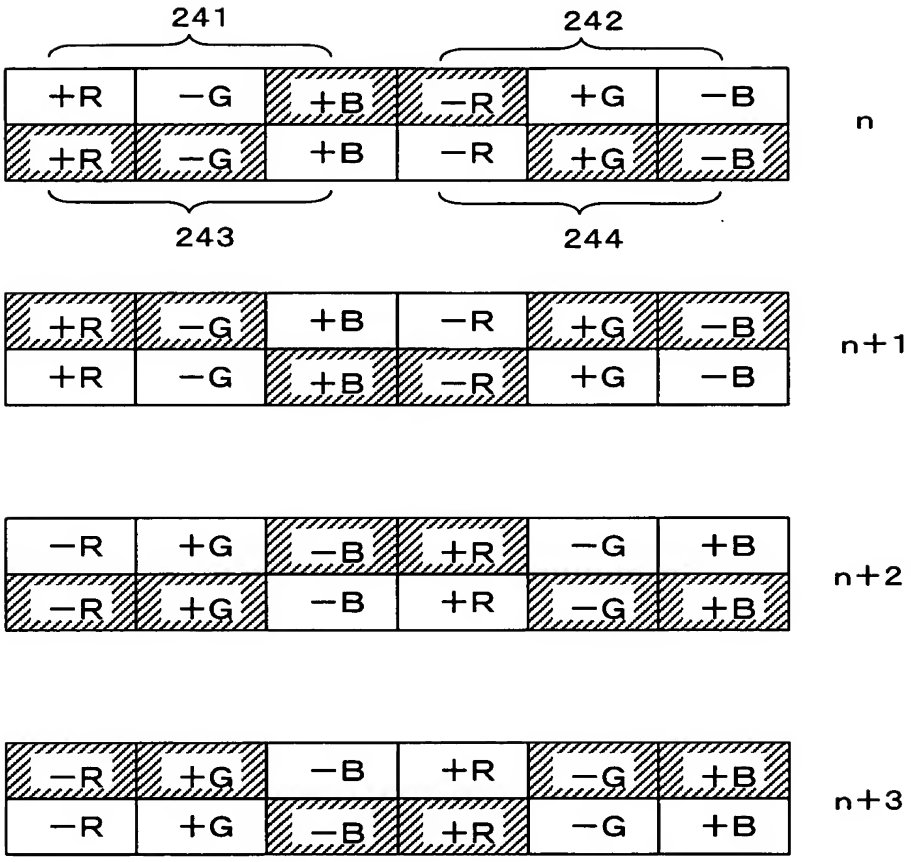

241
242
+R −G +B −R +G −B
+R −G +B −R +G −B
n
243
244
+R −G +B −R +G −B
+R −G +B −R +G −B
n+1
−R +G −B +R −G +B
−R +G −B +R −G +B
n+2
−R +G −B +R −G +B
−R +G −B +R −G +B
n+3

FIG.58

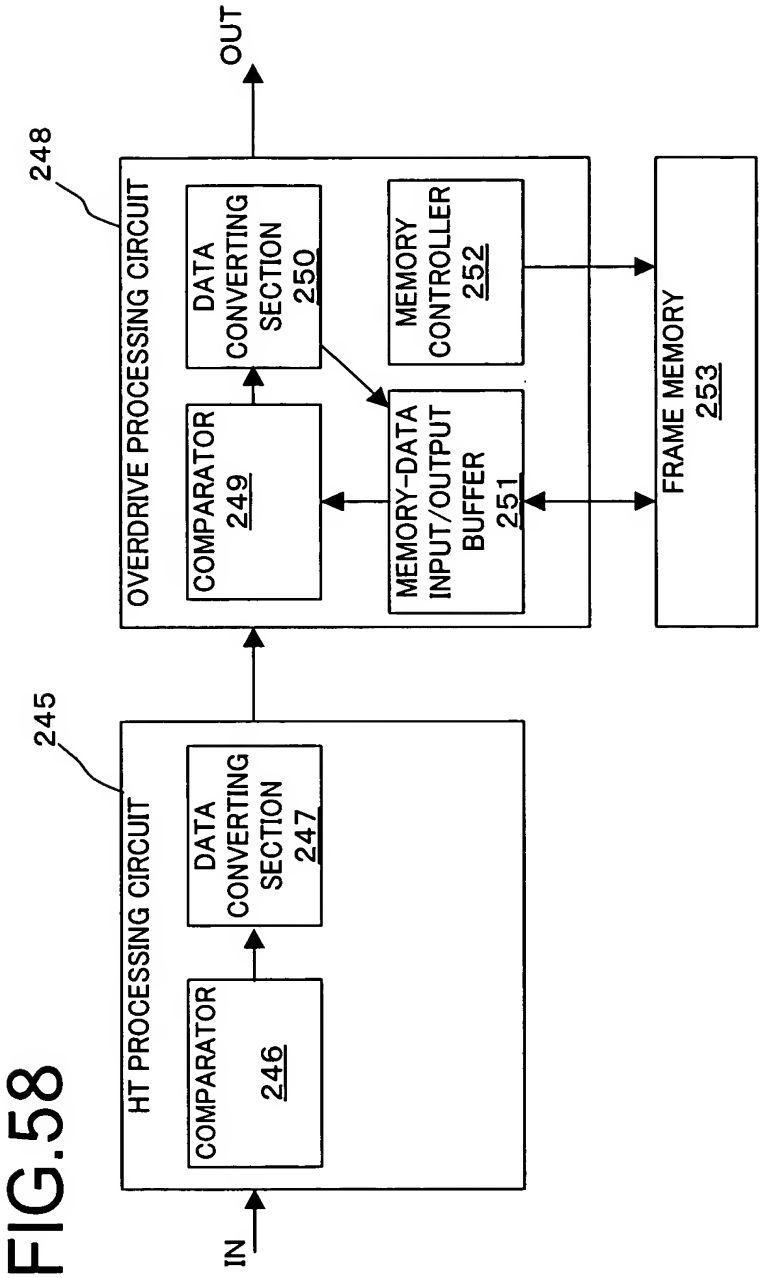

IN
OUT
245
HT PROCESSING CIRCUIT
COMPARATOR 246
DATA CONVERTING SECTION 247
248
OVERDRIVE PROCESSING CIRCUIT
COMPARATOR 249
DATA CONVERTING SECTION 250
MEMORY-DATA INPUT/OUTPUT BUFFER 251
MEMORY CONTROLLER 252
FRAME MEMORY 253

FIG.59

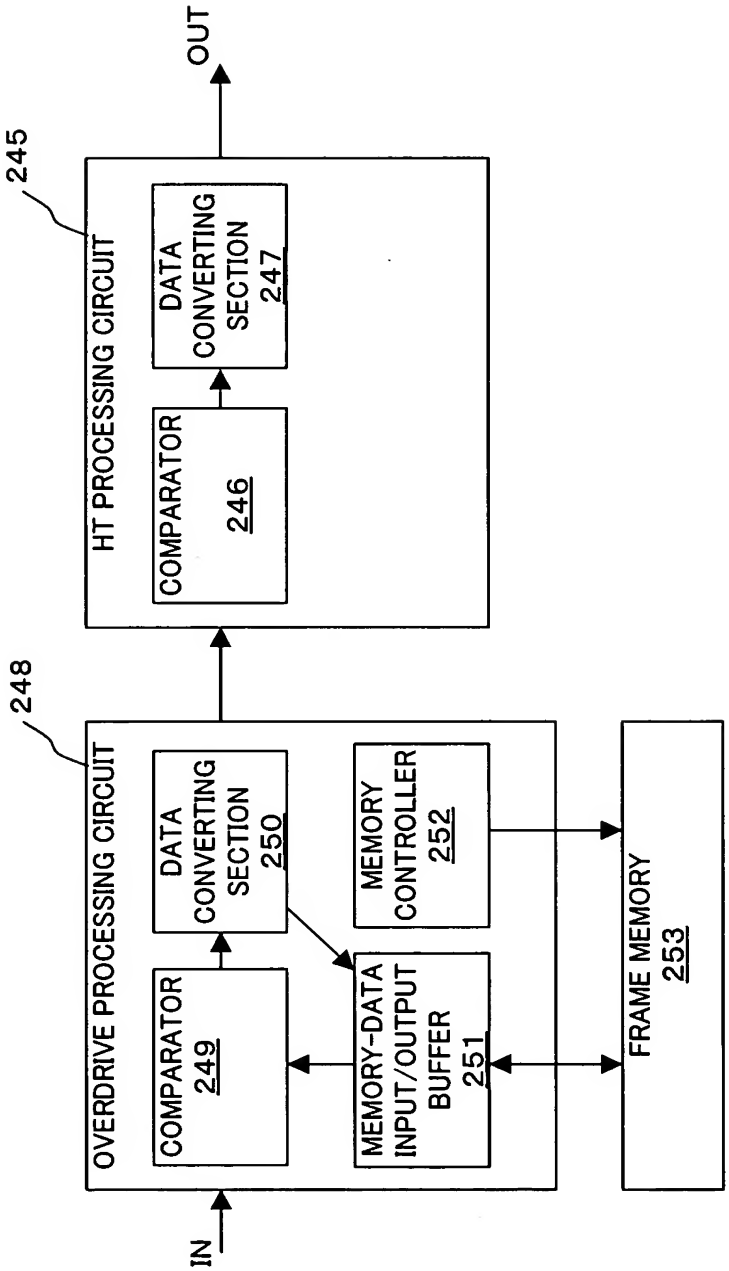

OUT
245
HT PROCESSING CIRCUIT
DATA CONVERTING SECTION 247
COMPARATOR 246
248
OVERDRIVE PROCESSING CIRCUIT
DATA CONVERTING SECTION 250
MEMORY CONTROLLER 252
COMPARATOR 249
MEMORY-DATA INPUT/OUTPUT BUFFER 251
FRAME MEMORY 253
IN

FIG.60

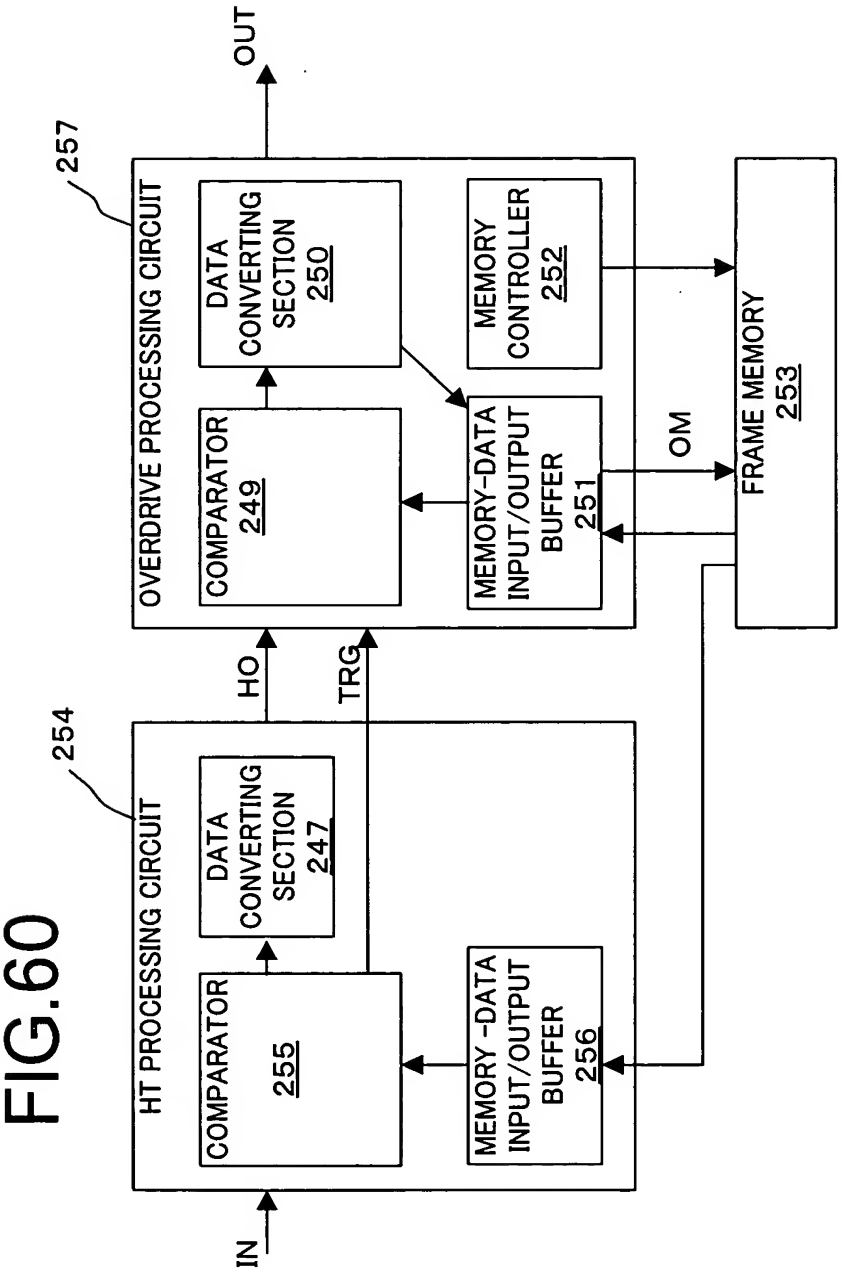

OUT
257
OVERDRIVE PROCESSING CIRCUIT
DATA CONVERTING SECTION 250
MEMORY CONTROLLER 252
COMPARATOR 249
MEMORY-DATA INPUT/OUTPUT BUFFER 251
OM
FRAME MEMORY 253
HO
TRG
254
HT PROCESSING CIRCUIT
DATA CONVERTING SECTION 247
COMPARATOR 255
MEMORY -DATA INPUT/OUTPUT BUFFER 256
IN

FIG.61A

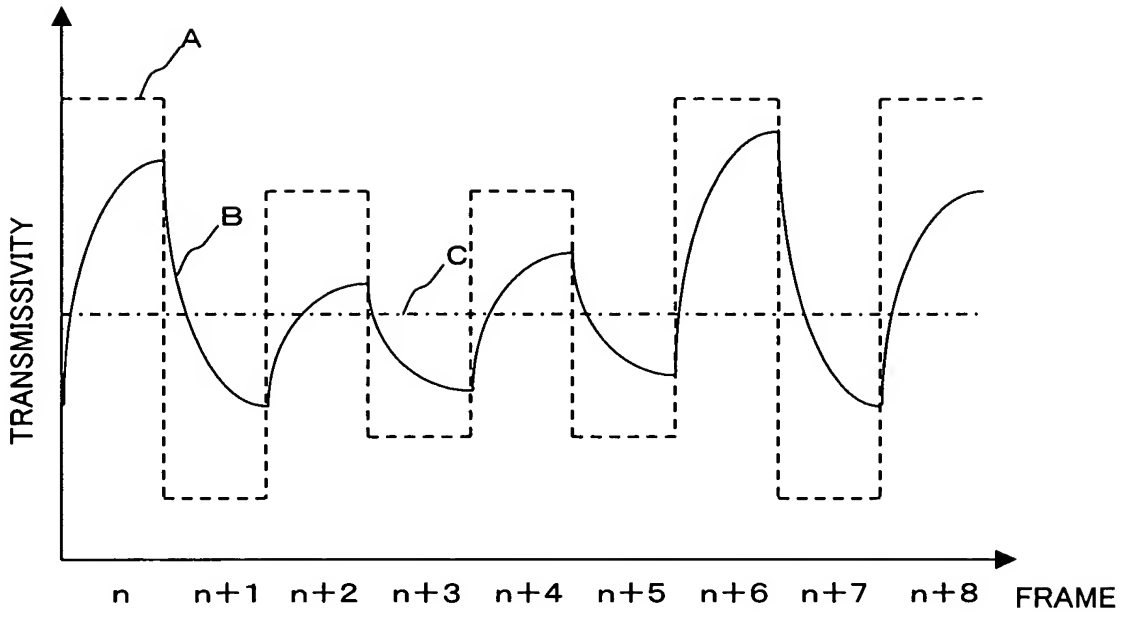


FIG.61B

DISPLAY FLAME	n	n+1	n+2	n+3	n+4	n+5	n+6	n+7	n+8
IN	32	32	32	32	32	32	32	32	32
HO	46	18	40	24	40	24	46	18	46
FL	18	46	18	40	24	40	24	46	18

FIG.62A

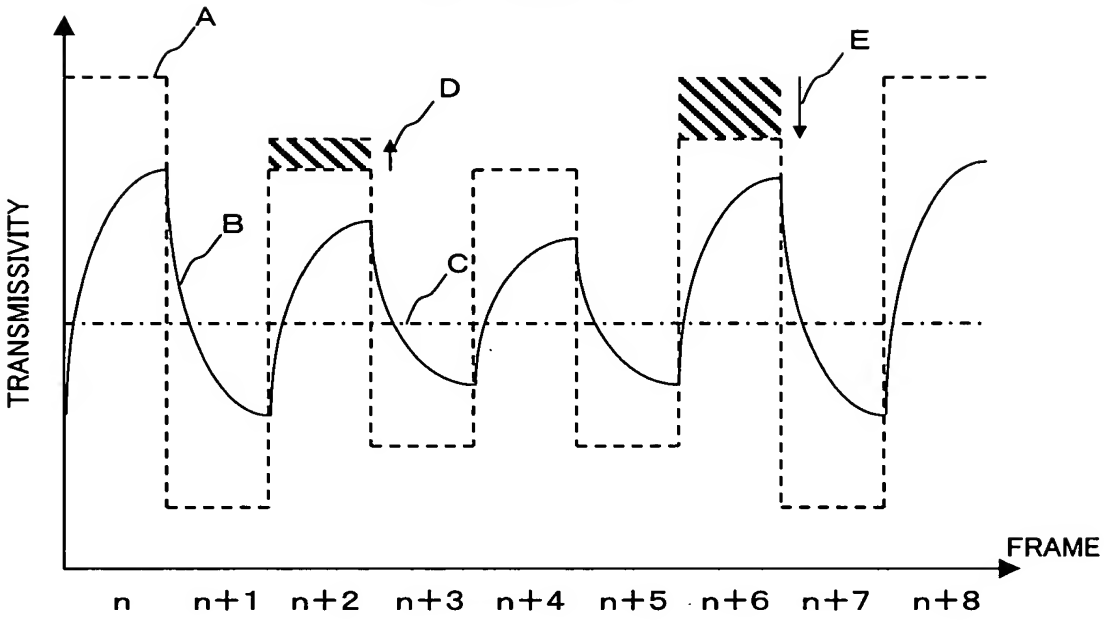


FIG.62B

DISPLAY FRAME	n	n+1	n+2	n+3	n+4	n+5	n+6	n+7	n+8
IN	32	32	32	32	32	32	32	32	32
HO	46	18	40	24	40	24	46	18	46
FL	18	46	18	40	24	40	24	46	18
OUT	46	18	42	24	40	24	42	16	46
OM	46	18	40	24	40	24	46	16	46
TRG			O				O		
CO			+2				−4		

FIG.63

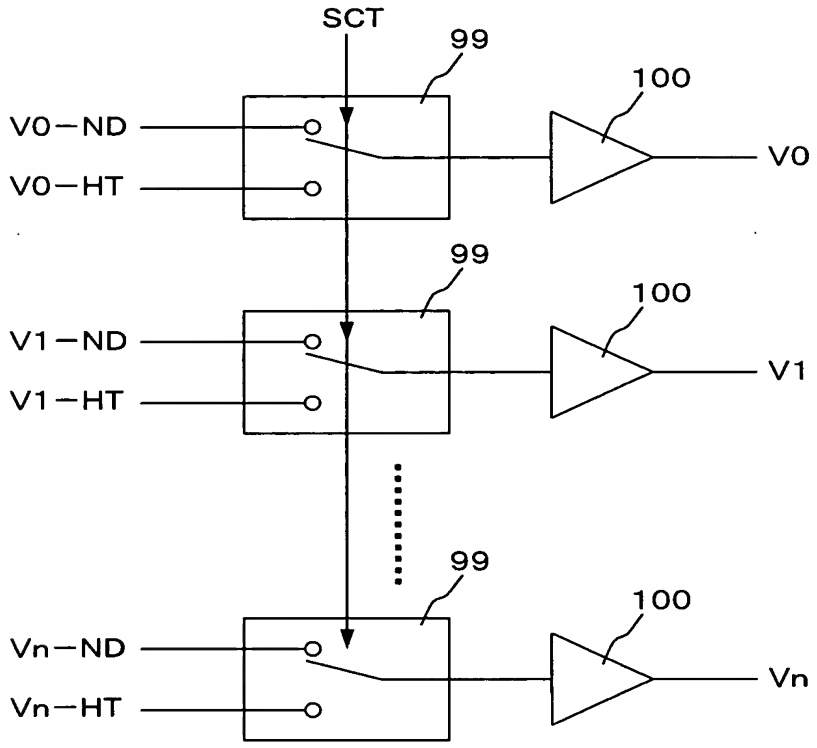


FIG.64

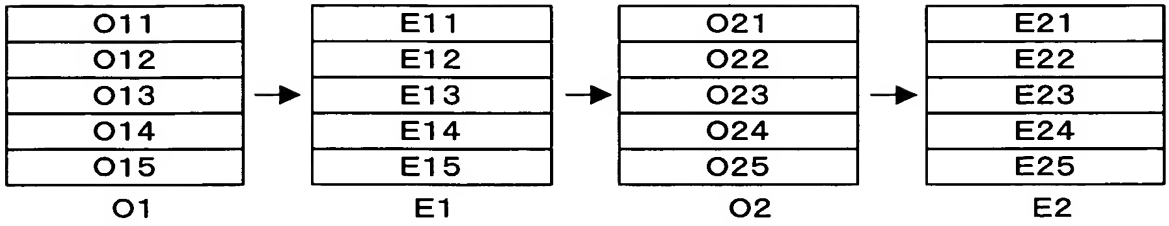

O11
O12
O13
O14
O15
O1
E11
E12
E13
E14
E15
E1
O21
O22
O23
O24
O25
O2
E21
E22
E23
E24
E25
E2

FIG.65

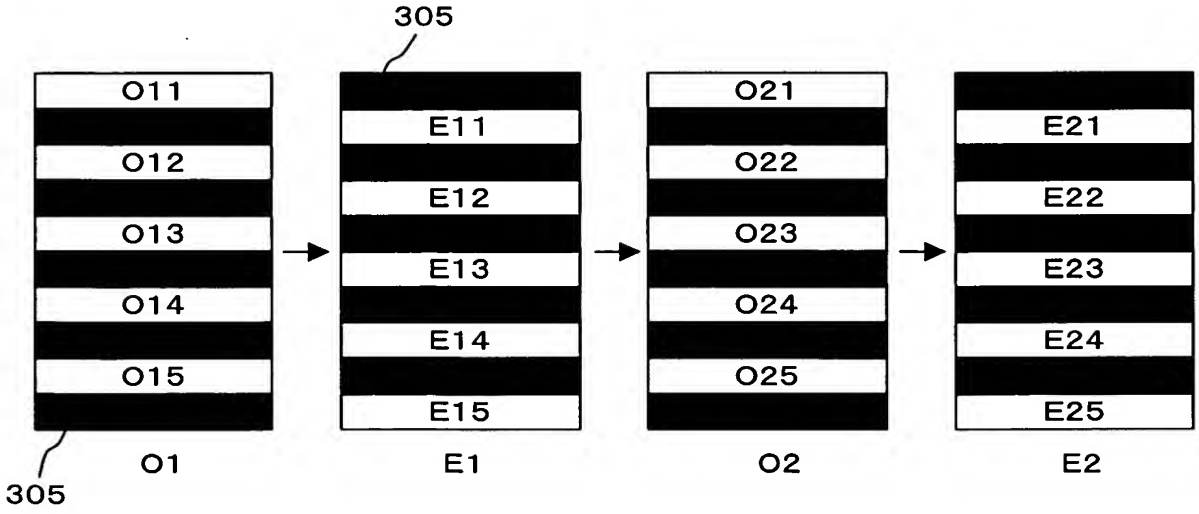
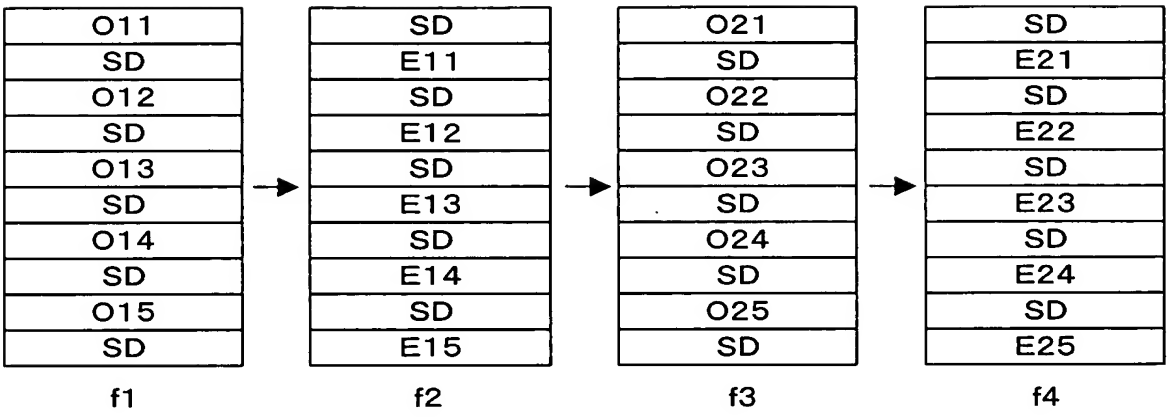

305
O11
O12
O13
O14
O15
O1
305
E11
E12
E13
E14
E15
E1
O21
O22
O23
O24
O25
O2
E21
E22
E23
E24
E25
E2

FIG.66


O11
SD
O12
SD
O13
SD
O14
SD
O15
SD
f1
SD
E11
SD
E12
SD
E13
SD
E14
SD
E15
f2
O21
SD
O22
SD
O23
SD
O24
SD
O25
SD
f3
SD
E21
SD
E22
SD
E23
SD
E24
SD
E25
f4